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This brochure is also available in Basque and Spanish.

OPEN CODES. WE ARE DATA

Azkuna Zentroa - Alhóndiga Bilbao presents from October 23, 2019 to January 26, 2020 the exhibition *Open Codes. We are data*, a reflection on the world we live in today: a world that is created and ruled by codes.

Digital codes determine how we perceive our surroundings, they influence our financial systems, our legislations and our business models; in essence, they shape and create new horizons for social, economic, or cultural activity.

Technology pierces us with an avalanche of advances we have to adapt to. It is a generator of future and destinations, even though it controls us as well. The art perspective of this new reality aims to open a path and enable society to convert technology into a tool as opposed to a chain, besides developing a critical position regarding its individual and global consequences.

The exhibition project *Open Codes. We are data* is also a critical vision of contemporary culture, likewise a symbolic strategy, both physical and conceptually in equal measure. It studies art technology from the beginning of time to modern day, and includes essential cultural and philosophical elements. To do so, it opens the code, its genotype, i.e. what is inside to know it and understand it. Apart from conceptual barriers, it also breaks physical ones. Therefore, the exhibition goes beyond its usual location in the exhibition hall and expands to the Atrium, Mediateka and Physical Activity Centre.

Open Codes. We are data is conceived as an experimental space for creative encounters, where knowledge production on understanding computer codes and artistic approaches take place at a single venue. It is an attempt to engage with today's realities and point out perspectives and lines of development for the future in order to better understand the world we live in: a world that has become a field of data.

The exhibition is accompanied by a public programme which includes talks, workshops and a contemporary film cycle. We invite our visitors to experience the exhibition hall as if it were a space open to thought, an art & science laboratory, a co-working & meeting place, a new way of congregating aimed at exchanging and acquiring knowledge, in other words, a new collaboration format.

Exhibition organized by Azkuna Zentroa - Alhóndiga Bilbao in collaboration with ZKM | Center for Art and Media, Karlsruhe (Alemania).

Idea: Peter Weibel.

Curatorial team: Blanca Giménez, Jaime de los Ríos, Fernando Pérez, Rakel Esparza.

EDITORIAL

Peter Weibel

All culture is culture technique and relies on tools, be it a pen, a brush or a piano. The tools of analogue culture have been material hardware. In the digital culture the tools are immaterial software, from programming to coding. Artists have developed new interfaces between men and machine, which allow new interactions and cooperation between them with the help of new expert systems, from algorithms to artificial intelligence. Artists create sensor and data based environments and events, which optimize the relations between individuals and social and natural systems. If the world is a field of data, than we need the art of coding that can guide us through it. We together will open the doors to the world of codes, which opens the doors to the analogue and digital world.

Living in digital worlds means increasingly a life spent in a programmed, smart environment, a so-called 'scripted reality' and 'infosphere'. The script is dictated in part by sensors, which provide information about the state of reality around us. The data from the sensors are processed by algorithms, which steer us through the world as through a field of data. For the world we live in is not so much just a natural world all by itself, but more and more an artificial, human-made data world.

The basis of our data world is the binary code. This code essentially consists of the ciphers 0 and 1, through which an almost infinite set of numbers can be formed. While the alphabetical code predominated as the primary code for human culture and communication for thousands of years, today a numerical code dominates our world.

What Samuel Morse did in 1833 for the alphabetical code, namely, reduce the 26 letters of the Latin alphabet to two kinds of signals, long or short signals, Gottfried Wilhelm Leibniz accomplished in 1697 for the numeric code. [G. W. Leibniz in a letter to Rudolph August, Duke of Brunswick-Lüneburg, known as the New Year's Letter, January 12, 1697.] Leibniz proved that all numbers can be represented by just two digits, 0 and 1. Which implies the possibility of encoding and also decoding any kind of information as a row of digits in a binary system.

Subsequently the language of data, algorithms, and programming has become a universal language out of which the world of sounds, images, texts, and things emerges. Thus, mathematics has long since ceased to be just the language of nature; it has become the language of culture, too. The relationship between things, sounds, words, and images used to be irreversible. However, now in the digital world the relationships between data and words, images and sounds, even between data and things (3D-printing), are reversible in the digital world.

EXHIBITION MANUAL

#GenealogyOfCode
#Encoding
#MachineLearning
#AlgorithmicGovernance
#Labor&Production
#AlgorithmicEconomy
#GeneticCode

We live in an age where knowledge production, dissemination, and acquisition are changing on a global scale due to the ongoing evolution of technologies based on codes. Of central importance in these debates is the position and purpose of an art exhibition in this day and age. With *Open Codes. We are data* we are proposing a new exhibition concept, which breaks with rigid structures and outdated attitudes. To this end, we have developed a deinstitutionalized format, a platform of knowledge to which access is always free, and which resembles closely the actual worlds in which we live and work.

In the exhibition various approaches are tried out to test new forms of encounter and critical debate. Please feel free to use the following tools in order to address the exhibition:

// HASHTAGS

The many topics dealt with in the exhibition are grouped in seven key areas:

#GenealogyOfCode #Encoding #MachineLearning #AlgorithmicGovernance #Labor&Production #AlgorithmicEconomy #GeneticCode

A distinguishing feature of the exhibition is that the artworks are not physically grouped according to themes. The overarching topics are presented as title hashtags together with other hashtags associated with these titles. This allows you to draw connections among the different themes. This hashtag system is similar to how hashtags are used in the media, and thus represents for the open, flowing, and dynamic connections between themes that is so characteristic of our networked world.

// THE BROCHURE

The brochure you are holding in your hands is one of the main tools for navigating the exhibition. In addition to this manual, it contains an introduction by ZKM director Peter Weibel, texts describing the seven thematic areas, descriptions of the artworks on show, and a map of the exhibition.

// OPEN SPACE

All over the exhibition you will find work and leisure stations* where you can sit down at any time to read, write something down, or do anything else you feel inspired to do. The Open Space is designed so that various public events can take place there. Workshops, lectures, and roundtable discussions will be held and everyone is invited to get involved.

The important thing about this space is that you can shape its content. We provide the infrastructure; you fill it with ideas. If you would like to organize an event here, just visit the website openspace.azkunazentroa.eus to check availability.

* The furniture of the exhibition has been created with the collaboration and counsel of Dinof.

#GenealogyOfCode

#Binary
#Computing
#NumeralSystem
#Babel

Computation clearly does not begin with personal computers and their direct ancestors from the twentieth century. To find the roots of the principles upon which computation of today is based on one has to go back at least to the Middle Ages.

From Ramon Llull and his *Ars Combinatoria* to Gottfried Wilhelm Leibniz's Binary system, from Charles Babbage, Ada Lovelace and George Boole to Claude Shannon and Alan Turing, from the appearance of electronically powered computers and programming languages to the emergence of Quantum computing, *Open Codes. We are data* tries to elaborate a picture of the last centuries in terms of the history and development of computing.

#Encoding

#MorseCode
#ProgrammingSound
#Algorithm
#Software
#Hardware
#Interface
#Decoding

From genetic code to music notation, from safety codes and standards to Morse code, the term 'code' may designate recognizable elements and familiar processes, but what does it mean in terms of programming and computing?

The Dictionary of Computing defines code as "a rule for transforming a message from one symbolic form (the source alphabet) into another (the target alphabet)" (Butterfield and Ngondi, 2016, p.93). This way of performing designates precisely one of its main characteristics: code is at the same time legible and executable; it is simultaneously a medium and an instruction. Another crucial aspect of computer code is its deceptive invisibility. Code is generally hidden; it lacks materiality in itself and remains mostly unseen inside the machine, but it generates visible, concrete, and tangible effects in the world.

Even in common, ordinary applications such as sending an SMS, code executes an extremely high number of algorithmic operations. By running these and other processes, code nowadays has the capacity to process and control many different operations within seconds, shaping and creating new horizons for social, economic, or cultural activity.

#MachineLearning

#ArtificalIntelligence
#PatternRecognition
#AutonomousSystems
#SelfDrivingCars
#Drones
#Robots

In computer science Artificial Intelligence (AI) determines the study of intelligent agents investigating forms of mechanical or 'formal' reasoning. AI was founded on the idea that a machine can precisely simulate human intelligence; it was the attempt to hand code knowledge about the world in formal mathematical language. This approach was successful for so-called expert systems, which were able to carry out complex tasks, such as medical diagnosis, or planning and configuration at the level of human experts. But as it turned out, these systems were difficult to program and, most importantly, they were not able to inherently learn.

Frank Rosenblatt developed in the mid-1950s the foundations for Machine Learning, a field of AI that explores forms of computation, which allow programs to change and adjust its internal parameters automatically. In its practical application machine learning algorithms are heavily employed for Pattern Recognition, an area particularly relevant for autonomous systems such as self-driving cars, drones, and robots. In essence, machine learning reconstitutes what thinking means and raises many ethical and legal questions with regard to automated decision-making, liability, and accountability.

#AlgorithmicGovernance

#BigData #QuantifiedSelf

Governance refers to a process of governing: the way in which norms, laws, and actions are structured, sustained, and held accountable, whether undertaken by the government, society, or the market economy. Essentially, it involves the practice in which societies are organized, the logic or language of regulation. Hence governance also implies a way of exercising power over someone or something. Algorithmic Governance explores the formal and informal rules of organizing the living through algorithms. It raises immanent questions of how algorithmic processing should be regulated and legislated.

Underlying new forms of governance is the way in which data is gathered and analyzed in order to ascribe value. The last decade has seen an explosion in the amount of data that is being captured and processed in real time. Our environment is increasingly encoded, rendered machine-readable, uniquely indexical, and identifiable by the vast assemblage of connected devices and sensors. Daily life is becoming more and more mediated by digital devices and facilitated by computational infrastructure. In consequence, governance seems to have turned into a struggle of *how* data is evaluated and *by whom*. Individuals are thereby turned into 'dividuals', numerical bodies of code comprised of data assemblages. On the basis of these profiles governments and businesses implement their agendas. Control is exercised subtly, making it seem as if the dividual is acting autonomously, yet it lacks the ability to make decisions of its own volition.

#Labor&Production

#Industry4.0
#InternetOfThings
#Programming
#SmartFactories
#Automation
#Work4.0

The desire for on demand goods and services, customized to one's personal tastes and available 24–7, is steadily increasing. It is a phenomenon of the digital economy, a business model that cuts across sectors – including manufacturing, services, transportation, and telecommunications – which is heavily reliant on information technology. This model is reshaping the organization and management of the entire value chain of consumer goods and putting in place a new infrastructure.

The approach has been termed Industry 4.0 and is characterized by its interoperable design where machines, devices, sensors, and people are connected and can exchange relevant information in real time over the Internet of Things. In modular structured Smart Factories the implemented software recognizes defects or mistakes at an early stage and is able to counteract them.

The greatest transformation that the new business models bring with them is the way in which labor is organized. Routine and low-skill jobs are increasingly threatened by automation. In this economy knowledge is the key: the changeover from a labor-based society to a knowledge society is imminent.

#AlgorithmicEconomy

#HighFrequencyTrading #Bitcoin #Cryptocurrencies #Decrypt #Blockchain

In a world where everything is becoming digital, it was only a matter of time before money could be generated in a digital way. Algorithms nowadays drive a great number of stock trades, digital currencies have been released in the last years, so it seems quite logical to ask: which impacts has the implementation of code had in our globalized economy? Which systems have appeared – or will appear in the future?

As an alternative to the hegemonic system and its financialization, Bitcoin was released online in 2009, followed by many other digital cash currencies, such as Ethereum or Litecoin. But what makes them different from traditional currencies? As its name implies, they are based on a cryptographic system, which means that the code behind them is elaborated on a system that keeps information secret. Only the people – or more precisely, the programs – that know how to solve it, how to *decrypt* it, will have access to this information. Cryptocurrencies are also immaterial and decentralized. Unlike centralized banking, where governments control the currency values through the process of printing money, governments have no control over cryptocurrencies: their value circulates on the Internet without the involvement of any intermediaries.

Like other disruptive technologies born in the digital age, cryptocurrencies are indeed challenging the way things have been done in economics so far, foreseeing a future in which middlemen would become obsolete. It is not possible to predict the future, but to understand the world we live in and the economy we are building, we necessarily need to recognize and analyze the power of algorithms and computation.

#GeneticCode

#DNA
#SourceCode
#Bioengineering
#Phenotype
#DNADataStorage

DNA is known to contain the Source Code. Genetic code is the set of rules by which information encoded within genetic material is translated into proteins by living cells.

The description of genetic code began in the 1950s. By the end of the 1960s it was clear that the genetic information in DNA, a macromolecule forming a double helix, is made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). At this time the central dogma of molecular biology became that DNA contains the code for the construction of proteins that structurally 'execute' life.

To decipher the code of the biological 'Book of Life', was a central issue in molecular biology; a project like *The Human Genome Project* (1990-2003) is a good example of this. It has been recently discovered that DNA molecules can store any data. Textual and visual information, even moving images, can be converted to binary then to genetic code.

WORKS IN THE EXHIBITION

b7 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 96 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 a6 05 77 cb 0a cc 79 82 1e d8 e0 b7 5f 62 46 0f 06 99 12 ef 58 e9 05 8d 15 34 15 40 3e 03 be f8 1e e \mathbf{P}_{6}^{6} \mathbf{P}_{6}	5a b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 df 02 c3 75 50 ae ff 1a 33 35 c6 aa b5 7f(); bc ff 41 07 86 33 62 1c c9 e8 fPinnerWidth, window. 83 05 50 26 54 cf 3b e9 8f f0 f0 7a b6 14 df 5c e9 14 43 48 2binit() function c5 e7 9f 55 fr function onDocument() yPress(event) {
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YOU:R:CODE opens the exhibition Open Codes. We are data. The title can be read in two different ways: the interpretation 'your code' indicates that in the installation visitors experience different kinds of digital transformations of themselves. Whereas on entering, a visitor still sees their familiar reflection in a mirror – the most real virtual depiction that we can imagine – the mirror image gradually transforms into a digital data-body until finally, the visitor is reduced to an industrially readable code. In the end he/she breaks free from the virtual depiction, and is materialized in a flip-dot display.

The second way of reading the piece's title, 'you are code', emphasises that we ourselves consist of code, which amongst other things is manifested in the genetic code. The genetic code constitutes the algorithm of life and from birth it determines what we do. In current research projects synthetic DNA strands even serve as long-term storage for digital data. And for the data analysts and artificial intelligences operating in cloud computing, too, which via smartphones give us our daily instructions for acting, we are only perceived in a mediated way in the form of sensor data and via our electronic traces and expressions – to them we are codes.

Bernd Lintermann (1967, Germany). He works as artist and scientist in the field of real time computer graphics with a strong focus on interactive and generative systems. The results of his research are applied in the scientific, creative and commercial context. His work includes prints, interactive installations, projection environments and stage performances combining generative imagery and sound. He is presently engaged in the development of Augmented Reality for mobile end devices to provide access to digital contents in a public environment. His works have been exhibited in museums and festivals all over the world and worked with internationally renowned artists, like Jeffrey Shaw, Bill Viola, Peter Weibel and the Wooster Group.

Peter Weibel (1944, Ukraine). Weibel is an internationally known conceptual artist, curator and new media theoretician. Since 1999, Peter Weibel is Chairman and CEO of the ZKM | Center for Art and Media Karlsruhe and since 2017 director of the Peter Weibel Research Institute for digital Cultures at the University of Applied Arts Vienna.

bernd-lintermann.de
peter-weibel.at



Comprising data paintings, augmented data sculptures and light projections, *Melting Memories* debuts new advances in technology that enable visitors to experience aesthetic interpretations of motor movements inside a human brain. Each work grows out of the artist's impressive experiments with the advanced technology tools provided by the Neuroscape Laboratory at the University of California, San Francisco. Neuroscape is a neuroscience center focusing on technology creation and scientific research on brain function of both healthy and impaired individuals.

Anadol gathers data on the neural mechanisms of cognitive control from an EEG (electroencephalogram) that measures changes in brain wave activity and provides evidence of how the brain functions over time. These data sets constitute the building blocks for the unique algorithms that the artist needs for the multi-dimensional visual structures on display.

Refik Anadol (1985, Turkey) is a media artist, director, and pioneer in the aesthetics of machine intelligence. His body of work locates creativity at the intersection of humans and machines. In taking the data that flows around us as his primary material and the neural network of a computerized mind as his collaborator, Anadol paints with a thinking brush, offering us radical visualizations of our digitized memories and expanding the possibilities of architecture, narrative, and the body in motion. Anadol's site-specific parametric data sculptures, live audio/visual performances, and immersive installations take many forms, while offering a dramatic rethinking of the physical world, our relationship to time and space, and the creative potential of machines.

refikanadol.com

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PLAY is simply a table tennis table. Its colors and surfaces, however, personify the prototypes of table tennis as a sociocultural phenomenon: two sides competing against one another in a game. The abstraction of the traditional table markings through colored surfaces expands the game's realm of possibilities to include improvisation. The table demands that the familiar game be conceived differently, that players act creatively and react spontaneously.

At the same time, *PLAY* complies with the requirements of DIN EN 14468, making it possible to play at a competitive level.

BNAG (Butternutten AG) is a Karlsruhe/Marrakesh-based design studio run by Oliver-Selim Boualam (1992, Germany) and Lukas Marstaller (1993, Germany).

bnag.cc

p7 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 5a 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc 02 c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db bc 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 83 d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 96 f0 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 e9 a6 05 77 cb 0a cc 79 82 1e d8 e0 b7 5f 62 46 c5 0f 06 99 12 ef 58 e9 05 8d 15 34 15 40 3e 03 55 be f8 1e es $p6 71 e4 5c$ b8 83 $p66 8e^{-}d4 s$	b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 ^{de} c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); ff 41 07 86 33 62 1c c9 e8 f?innerWidth, window.: 05 50 26 54 cf 3b e9 8f f0 7a b6 14 df 5⊂ 14 43 48 2binit() function e7 9f function onDocumentKeyPress(event) {
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A self-driving car is trapped by a salt circle on the slopes of Mount Parnassus. The circle's pattern of closed and broken lines forms a continuous no entry mark, preventing the automated vehicle from moving forward.

Occupying a physical and cognitive space visible to both humans and machines, the trap acts as both a refusal of technological determinism and an insistence on negotiation and systemic literacy.

James Bridle (1980, United Kingdom) is an artist, writer and theorist based in Athens and London. With a long-standing investigative interest in modern network infrastructure, government transparency, and technological surveillance, his artistic practice positions itself at the intersection of art, science, and political activism. In particular, he explores how the acceleration of technological advancement creates new ways to represent our physical world and affects our perception of the future by increasingly blurring the lines between the virtual and the real. His work incorporates software programming, social media, photography, installations, architectural rendering and maps.

@nomegallery

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In the age of data, Emma Charles' *White Mountain* explores the vast interlocking structures of planetary computation and the material infrastructures that permeate the depths of the Earth's geology.

White Mountain focuses on the Pionen Data Center in Stockholm - a former Cold War-era civil defence bunker redesigned by architect Albert France-Lanord. Located 30 meters under the granite rocks of Stockholm, the hydrogen bomb proof subterranean hub has been constructed with direct references to science fiction films such as *Silent Running*, and the classic Ken Adam designed Bond-villain lairs.

White Mountain explores the protected architecture of data and the value we place on digital information. With accompanying script written by Jussi Parikka.

Emma Charles (United Kingdom) is a London-based artist. Working with photography and experimental approaches to sound and moving image, her work often transverses the boundaries between documentary and fiction. She works both in analogue and digital formats which is often mediated by the subject in which the physical and material focus of the work become implicit in the aesthetic process. Current research areas include architecture, digital cultures, economics and temporality. Charles holds a MA in Photography from Royal College of Art. She has exhibited and screened at Jerwood Visual Arts, London; Serpentine Galleries, London; ZKM, Karlsruhe; HKW, Berlin; Jeu de Paume, Paris, LUX and ICA, London and is the recipient of a 2015, 2017 & 2018 Arts Council England award, Elephant Trust fund, ZKM commission and has been published in 'Reset Modernity!' edited by Bruno Latour (MIT Press).

emma-charles.com

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2001 100011 is a faithful translation of the screenplay of Stanley Kubrick's 2001: A Space Odyssey into binary code. Presented in the standard screenplay format—8.5 x 11 inches, three-hole punched and ring-bound—its monumental 419 pages are immediately unintelligible to both human and machine readers.

As such, 2001 100011 is an impossible object, occupying the ambiguous and increasingly opaque space between people and computers. The book reflects the artist's opinion that Kubrick's film is a prescient allegory about the impossibility of true communication between two forms of intelligence when each holds what the other lacks.

Claire L. Evans (1984, United Kingdom) is a writer, artist, and musician based in Los Angeles. She is the singer and coauthor of the pop group YACHT, the founding editor of 'Terraform', VICE's science-fiction vertical, and the author of *Broad Band: The Untold Story of the Women who Made the Internet* (2018, Penguin Random House). She is the former Futures Editor of Motherboard, and a contributor to frieze, Rhizome, The Guardian, Wired, and Aeon. Her projects have been presented by the Walker Art Center, the New Museum of Contemporary Art, the Riverside Museum Beijing, MU Artspace Eindhoven, and the Gaité Lyrique. She is an advisor to graduate design students at Art Center College of Design and a member of the cyberfeminist collective Deep Lab.

clairelevans.com

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'Red Coin' mining has recently made the People's Republic of China the world's largest Bitcoin producer. Mining requires exertion and it slowly makes new currency available at a rate that resembles the rate at which commodities like gold, copper, diamonds, nickel, rare earth, silver, uranium and zinc are mined from the ground. One of the reasons for the fast growth is the buildout of hydropower in the west of the country. The first petahash mining farms were built in Shanxi and Inner Mongolia where coal was cheap and plentiful, but cheap coal can't compete with free water and now the farms are migrating en masse towards the west.

Shot in a Chinese factory of Bitcoin generation, *Chinese Coin (Red Blood)* of the artist duo UBERMORGEN enters an electronically invisible space that knows very little, and explores both unpredictability and subversive power of cryptocurrency.

UBERMORGEN: lizvlx (1973, Austria) and **Hans Bernhard** (1971, Switzerland/United States) own 175 domains. Their main influences are Rammstein, Samantha Fox and XXXTentacion, Olanzapine, LSD, Kentucky Fried Chicken's Coconut Shrimps Deluxe and Viennese Actionism. CNN described them as 'maverick Austrian business people' and the New York Times called their project Google Will Eat Itself 'simply brilliant'. The have shown in institutions such as the Centre Pompidou, MoMA/PS1, Sydney Biennale, MACBA Barcelona, New Museum New York, SFMoma, ICC Tokyo, Gwangju Biennale, Serpentine Galleries London and Whitney Museum New York.

ubermorgen.com

57 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 5a 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc 02 c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db bc 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 83 d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 96 f0 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 e9 a6 05 77 cb 0a cc 79 82 1e d8 e0 b7 5f 62 46 c5 0f 06 99 12 ef 58 e9 05 8d 15 34 15 40 3e 03 55 be f8 1e c $\sqrt{5}$ 71 e4 5c b8 83 2b 66 8 2d $\sqrt{6}$	<pre>b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 df c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); ff 41 07 86 33 62 1c c9 e8 fPinnerWidth, window. 05 50 26 54 cf 3b e9 8f f0 7a b6 14 df 5c 14 43 48 2binit() function e7 9f ~ function onDocumentKeyPress(event) {</pre>
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Binoculars To... Binoculars From... is an installation, which is able to connect to a number of places in an extraordinary way. When you look through the binoculars, instead of seeing the scene physically in front of you, you are transported to a different site. This opening of a real-time window into another location is not unidirectional: when looking into the binoculars, your eye is captured and shown on the Sun Screen, where the observed is. Hence, people passing through the Atrium of Cultures, will see the huge-scale, searching eye looking at them.

As well as playfully connecting to different sites, this exhibition piece is dealing with issues of extended surveillance. In this respect Binoculars enables to see also the observer from the other side. Also this work underlines the ideas of the French anthropologist Marc Augé. *Binoculars To... Binoculars From...* creates an excess of time and space, allowing one to travel to a different location and be present there in a matter of milliseconds, whilst still remaining in their first physical location.

Varvara & Mar is an artist duo formed by **Varvara Guljajeva** (Estonia) and Mar Canet (Barcelona) in 2009. Often duo's work is inspired by the digital age. In their practice they confront social changes and impact of technological era. Artist duo has exhibited their art pieces in a number of international shows and festivals. Varvara & Mar have exhibited at MAD in New York, FACT in Liverpool, Santa Monica in Barcelona, Barbican and V&A Museum in London, Onassis Cultural Centre in Athens, Ars Electronica museum in Linz, ZKM in Karlsruhe, and more.

varvarag.info
facebook.com/varvaraandmar

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While the material book as sole bearer of textual information is increasingly being supplanted by the Internet and other electronic forms of publishing, the experience of digital reading is moving in the opposite direction: in the world of computer, computer network, and hypertext at first the book was completely transferred into an electronic format. Over the course of the development of electronic publications, however, they have gradually resumed making metaphorical reference to the book form and systematically implementing the book metaphor in software. In the latest phase, the book as an electronic device has come to imitate the physical and media characteristics of the traditional codex.

The reading stations of *Three Phases Of Digitalization* represent the next step in this shift: a camera mounted above the reading surface records a book lying there, the pages of which are empty save for page numbers. A projection made of pure white light is located in front of the observer. When viewed through a polarization filter, an image becomes visible, showing the digitally reconstructed book. Through augmented reality technology, the empty pages of the real books are filled with digital content in the projection. The book is an interface.

Bernd Lintermann (1967, Germany). He works as artist and scientist in the field of real time computer graphics with a strong focus on interactive and generative systems. The results of his research are applied in the scientific, creative and commercial context. His work includes prints, interactive installations, projection environments and stage performances combining generative imagery and sound.

Nikolaus Völzow (1980, Germany). He lives and works in Karlsruhe, Germany, and works at the Institute for Visual Media.

bernd-lintermann.de
voelzow.de



Level Of Confidence is an art project to commemorate the mass kidnapping of 43 students from the Ayotzinapa normalista school in Iguala, Guerrero, Mexico. It was released on March 26, 2015, exactly six months after the kidnapping took place. The project consists of a face-recognition camera that has been trained to tirelessly look for the faces of the disappeared students. As you stand in front of the camera, the system uses algorithms to find which student's facial features look most like yours and gives a level of confidence on how accurate the match is, in percent. The piece will always fail to make a positive match, as we know that the students were likely murdered and burnt in a massacre where government, police forces and drug cartels were involved, but the commemorative side of the project is the relentless search for the students and the overlap of their image with the public's own facial features.

Rafael Lozano-Hemmer (1967, México) is an electronic artist who develops interactive installations that are at the intersection of architecture and performance art. His main interest is in creating platforms for public participation, by perverting technologies such as robotics, computerized surveillance or telematic networks. Inspired by phantasmagoria, carnival and animatronics, his light and shadow works are 'antimonuments for alien agency'. He has received a numerous awards for his for, including two BAFTA British Academy Awards for Interactive Art in London, a Golden Nica at the Prix Ars Electronica in Austria, 'Artist of the year' Rave Award from Wired Magazine and a Rockefeller fellowship, among other.

lozano-hemmer.com

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$PR_{i} = \frac{1 - a}{n} + d \sum_{j \in \{1, \dots, n\}} \frac{1 - R_{j}}{c_{j}} \qquad R_{xy}(\tau) = (x * y)(\tau) = \int_{-\infty}^{\infty} \frac{1 - R_{j}}{c_{j}} = \frac{1 - R_{j}}{c_{j}}$	

In *Redundant Assembly* an arrangement of several cameras composes a live-portrait of the visitor from six perspectives simultaneously, aligned using face detection. The resulting image is uncanny, detached from the laws of symmetry and the depth perception of binocular vision. If several visitors are standing in front of the work, a composite portrait of their different facial features develops in real time, creating a mongrel 'selfie'.

A version of the work for public space includes a time-component that allows the face blending to take place mixing present and the past. Face recognition is a technique often used by police, military, and corporate entities to search for and find suspicious or target people. Here the same technology is used to confuse portraits and emphasize the artificiality and arbitrariness of identification.

Rafael Lozano-Hemmer (Mexico City, 1967) is an electronic artist who develops interactive installations that are at the intersection of architecture and performance art. His main interest is in creating platforms for public participation, by perverting technologies such as robotics, computerized surveillance or telematic networks. Inspired by phantasmagoria, carnival and animatronics, his light and shadow works are 'antimonuments for alien agency'. He has received a numerous awards for his for, including two BAFTA British Academy Awards for Interactive Art in London, a Golden Nica at the Prix Ars Electronica in Austria, 'Artist of the year' Rave Award from Wired Magazine and a Rockefeller fellowship, among other.

lozano-hemmer.com

b 7 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 5a 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc 02 c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db bc 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 83 d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 96 f0 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 e9 a6 05 77 cb 0a cc 79 82 1e d8 e0 b7 5f 62 46 c5 0f 06 99 12 ef 58 e9 05 8d 15 34 15 40 3e 03 55 be f8 1e e3 6 71 44 c b8 83 2b 6 P8 6 44 70 9d e4 a8 cc 43 b 96 f0 74 P8 6 44 70 9d e4 a8 cc 43 b 96 f0 74 for each constraint of the second state of the se	<pre>b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 de c3 75 50 ae ff 1a 33 35 c6 aa b5 7f(); ff 41 07 86 33 62 1c c9 e8 ffinnerWidth, window.: 05 50 26 54 cf 3b e9 8f f0 7a b6 14 df 5c 14 43 48 2hinit() function e7 9f function onDocumentKeyPress(event) { f (alphabet.indexOf(ch) + 1) { if (display == "main") rotateTo(ch, next_let</pre>
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<pre>camerabox.add(camera); camerabox.name = "camerabox"; scene.add(camerabox); control = new THREE. DeviceOrientationControls(scene. getObjectByName("camerabox")); } else if (display == "history") { scene.add(ABCMatrix(hms)); setIntialMatrix(lH, "history"); }</pre>	<pre>function mainObject(scale = 1, Xpos = 0, Ypos = { let container = new THREE.Object3D(); container.name = name; container.add(elementMesh.clone()); container.scale.copy(v3(scale, scale, scale)) container.translateX(Xpos).translateY(Ypos); container.length = container.children[0].lenger container.tween = new TWEEN.Tween(); return container; } $C_S = B \log_2 \left(1 + \frac{1}{D}\right)$</pre>
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Both pieces *What Shall We Do Next?* (Sequence #1) and (Sequence #2), exhibited at *Open Codes. We are Data*, are two out of three sequences of *What Shall We Do Next?* that Prévieux has created to date.

What Shall We Do Next? (Sequence #1), located in the screens at the Physical Activity Centre, is an 'archive of future actions'. Noting that technology plays the role of a prescriber of behaviours, which are increasingly private property, the artist appropriates these gestures and subtracts them from their utilitarian function. He imagines a series of figures that seem to float on the surface of the screen and turn the demonstration video into a choreographic abstraction.

In that context, *What Shall We Do Next?* (Sequence #2), is a video made with six performers. They perform the diagrams found in the patents, considering patents as dance scores. Prévieux takes ownership of these movements and frees them from their practical function through choreographic abstraction.

Julien Prévieux (1974, France). Lives and works in Paris. His work has been exhibited in France (Musée d'Art Moderne de la Ville de Paris, FRAC Basse-Normandie, 2012; Galerie Jousse Entreprise, Paris; Galerie Edouard Manet, Genneviliers), the Netherlands (Witte de With, Rotterdam), Austria (Kunsthalle Krems), Taiwan (Kaohsiung Museum of Fine Arts), Los Angeles (Los Angeles Municipal Art Gallery), and at the 10th Istanbul Biennale, Turkey. He was one of the nominees for the Prix Marcel Duchamp, 2014.

previeux.net

b7 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 fd dd 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 f c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 d 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 9 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b a6 <td< th=""><th>9 5a b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 d^c c 02 c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); b bc ff 41 07 86 33 62 1c c9 e8 fPinnerWidth, window. 8 83 05 50 26 54 cf 3b e9 8f 6 f0 f0 7a b6 14 df 5c 7 e9 14 43 48 2binit() function 6 c5 e7 9f 3 55 4</th></td<>	9 5a b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 d ^c c 02 c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); b bc ff 41 07 86 33 62 1c c9 e8 fPinnerWidth, window. 8 83 05 50 26 54 cf 3b e9 8f 6 f0 f0 7a b6 14 df 5c 7 e9 14 43 48 2binit() function 6 c5 e7 9f 3 55 4
be f8 1e e 6 71 e4 c b8 83 66 86 d4 80 2c e9 7 8 4 a8 9 h ea Sand 9d cd d3 50 d9 65 80 eb d5 b3 h enderer. f3 58 5f 2 6 Germany 8a 62 fd c7 6b 6 fitListener("keypress", 25 60 ee a8 y Press, false); 1b 9a.8 ^e = new THREE.Scene();	<pre>function onDocumentKeyPress(event) { "erfunction onDocumentKeyPress(event) { let ch = String.fromCharCode(event.which); if (alphabet.indexOf(ch) + 1) { if (display == "main") rotateTo(ch, next_le if (display == "history") updateHMatrix(ch, } </pre>
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<pre>DeviceOrientationControls(scene. getObjectByName("camerabox")); } else if (display == "history") { scene.add(ABCMatrix(hms)); setIntialMatrix(lH, "history"); }</pre>	
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Today, computer-generated architectural designs translate spaces into 3-D renderings.

This work demonstrates the figures and sign systems employed to represent and construct the exhibition space, thus rendering its actual source code visible. Here, the inner architecture of the exhibition space at Azkuna Zentroa - Alhóndiga Bilbao is depicted as XML-SVG code on the walls of this room, spelling out the very figures that are based on the volume of the space. If these source-code figures were entered into a computer system, the architectural body would reemerge as a three dimensional image. While the series of figures appear to the viewer as colored patterns, this readable though undecipherable language is a tangible reference to the spatial drawing which is, at the same time, a drawing of the space.

Karin Sander (1957, Germany). She studied at the Staatliche Akademie der Bildenden Künste Stuttgart and at the Whitney Museum of American Art, New York, within the Independent Study Program (I. S. P.). Her work proposes a reflection on the context in which it is exhibited, often making invisible, but present, forms emerge and exposing with exquisite subtlety the sculpture that lives inside the objects that focus their attention. She currently lives and works in Berlin and Zurich. Since 2007 she teaches Architecture and Art at the ETH in Zurich.

karinsander.de

07 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 5a 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc 02 c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db bc 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 83 40 d0 fa af f0 f8 b0 23 5a dd 04 ac d2 8b 6 f6	a b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 d ^e 2 c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); c ff 41 07 86 33 62 1c c9 e8 f?innerWidth, window. 3 05 50 26 54 cf 3b e9 8f 6 70 b6 14 df 5c
9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 e9 a6 05 77 cb 0a cc 79 82 1e d8 e0 b7 5f 62 46 cc $0f 06 99 12 ef 58 e9 05 8d 15 34 15 40 3e 03 55be f8 1e e{}^{3}56 - {}^{1}64 - {}^{5}5 b8 S + {}^{6}6 - {}^{6}8 - {}^{4}6 - {}^{5}5 b8 80 2c e9 7 A + {}^{6}6 - {}^{6}$	<pre>14 43 48 2b_nit() function 5 e7 9f ~ 5 / function pnDocumentKeyBres (event) { let ch f s fin f Sm(bar bod set); if (slabshat index) f(ch) + (b) f </pre>
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<pre>else if (display == "mobile") { scene.add(mainObject()); let camerabox = new THREE.Object3D(); camerabox.add(camera); camerabox.name = "camerabox"; scene.add(camerabox); control = new THREE. DeviceOrientationControls(scene. getObjectByName("camerabox")); } else if (display == "history") { scene.add(ABCMatrix(hms)); setIntialMatrix(1H, "history"); } }</pre>	
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$n = rac{1}{j\in\{1,,n\}} c_j = \mu_{xy\setminus t} - \langle \mu, +y angle (t) = \int_{-t}^{t}$	

Alphabet Space is a dynamically three-dimensional notation, computer-based installation. In the analogue world, all notation was three-dimensional. Letters, images and notes were rigidly fixed onto two-dimensional surfaces. Here the possibility of displaying all 26 letters through a single three-dimensional sign arises from a three-dimensional object by Adam Słowik. Leibniz reduced the ten digits 1 - 9 and 0, through which all numbers can be described, to the two digits 0 and 1. Something similar takes place here, with a single object able to represent 26 letters.

This alphabet has a basic geometry, and the individual letters and signs are described through parameters such as the rotation or the position of the base. Individual letters are defined through a quaternion. Number sequences and words can be represented as movement via multiple quaternions. The viewer receives the current letter on the left screen via a projection of the base object. If the object stays still briefly, the letter is saved, it appears on the right screen, and the object can write a text sign by sign.

Adam Słowik (1980, Poland). He is a media art artist, who lives and works in Berlin, Germany.

Christian Lölkes (1990, United States). Artist and curator on media art, he lives and works in Karlsruhe, Germany.

Peter Weibel (1944, Ukraine). Weibel is an internationally known conceptual artist, curator and new media theoretician. Since 1999, Peter Weibel is Chairman and CEO of the ZKM | Center for Art and Media Karlsruhe and since 2017 director of the Peter Weibel Research Institute for digital Cultures at the University of Applied Arts Vienna.

@cloelkes peter-weibel.at

b7 53 56 85 c5 f7 ef ab 32 a9 fa ac 39 f0 d9 5a 4b 62 86 58 a0 84 cc 39 a5 99 d7 c6 c2 60 fc 02 c6 9f 70 c1 f1 b2 35 cf 5e b6 de 3c 48 c1 db bc 3b 67 ab 0a 1d c6 b3 07 d5 91 f4 d3 ac a7 b8 83 d0 d0 fa ef f9 f8 b9 23 5a dd 04 ec d2 8b 96 f0 9f b6 4e 70 9d e4 a5 cc c1 e6 ee c4 d2 54 b7 e9 a6 05 77 cb 0a cc 79 82 1e d8	b5 5c fa 73 cc 53 63 32 eb d3 3a 31 f4 df c3 75 50 ae ff 1a 33 35 c6 aa b5 7£(); ff 41 07 86 33 62 1c c9 e8 f9innerWidth, window. 05 50 26 54 cf 3b e9 8f f0 7a b6 14 df 5c 14 43 48 2binit() function e7 9f
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<pre>scene.add(ABCMatrix(abcms). translateX(window.innerWidth / 4)); setIntialMatrix(alphabet, "matrix"); }</pre>	
<pre>else if (display == "mobile") { scene.add(mainObject()); let camerabox = new THREE.Object3D(); camerabox.add(camera); camerabox.name = "camerabox"; scene.add(camerabox); control = new THREE. DeviceOrientationControls(scene. getObjectByName("camerabox")); }</pre>	
<pre>else if (display == "history") { scene.add(ABCMatrix(hms)); setIntialMatrix(lH, "history"); }</pre>	
<pre>window.addEventListener("resize", function() { let oCamera = scene. getObjectByName("camerabox").children[0]; oCamera.right = window.innerWidth / 2: oCamera.left = -window.innerWidth oCamera.left = COO Left 2 K(t) = K_0e^{\lambda t}</pre>	
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The Age of Fiction makes use of the nomenclature actually used in order to date time (B. C. Before Christ and A.C After Christ) to refer to the amount of time produced by time based media industries.

The Age of Fiction is a software application (Bergman) and an electronic display (Kawara) that generates a new chronology in real-time. This chronology refers to the fictional time elapsed until the time of consultation. Bergman makes use of the online platform Internet Movie Database as data source to compute the total time length of all films produced globally and displays the result in the format Year / Month / Day / Hour.

Each time the device is exposed to the public it shows the day, hour, month and year of the Fiction in which we find ourselves. The visibility condition of this new chronology is analogous to the condition public access to the piece. *The Age of Fiction* can be considered as a science fiction artefact.

Usue Arrieta and Vicente Vázquez have been collaborating and publishing their activities in the realms of visual arts and cinema since 2002 under different names. Trained as visual artists, their contributions to the fields of time based practices and dispositive design, the visual, the aural and the formulation of the social have been shown in public and private institutions as well as film festivals internationally. In 2013 they co-founded Tractora Co-op, an artist cooperative based on truck drivers co-op's operational model to further expand their longstanding collaborative practices. In 2018, together with Nader Koochaki, they created and presented -zko, a publishing house created with the aim to publish artists books, rooted in field work and experimental edition.

@weareQQ

EXHIBITION MAPS AND TECHNICAL SHEETS

MAP 1. EXHIBITION HALL

Floor -2

AUDIOGUIDE azkunazentroa.eus

EXHIBITION OPENING

Mondays closed Tuesday to Thursday and Sundays: 11:00am - 8:00pm

Fridays, Saturdays, Public Holidays and evenings before a Public Holiday: 11:00am - 9:00pm

GUIDED VISITS

Thursdays: 7:00pm

Free admission with prior registration at Az Info or calling: 944 014 014

Groups and Schools: 944 014 014



Bernd Lintermann & Peter Weibel / YOU:R:CODE

2017. Interactive installation with multichannel projection. Concept, realization: Bernd Lintermann / Audiodesign: Ludger Brümmer, Yannick Hofmann / Technological support: Manfred Hauffen, Jan Gerigk, Christian Lölkes / Production: ZKM | Hertz-Lab.

2 Refik Anadol / MELTING MEMORIES

2018. Projection. Designed and developed at Refik Anadol Studio: Nicholas Boss, Efsun Erkilic, Kian Khiaban, Ho Man Leung, Raman K. Mustafa, Toby Heinemann / Sound Design: Kerim Karaoglu / Software Development: Kyle McLean, Steffan Klaue / Scientific Support: UCSF, Neuroscape Lab Members, Adam Gazzaley (M.D., Ph.D.).

3 BNAG / PLAY

2016. Lacquered MDF, wood beams, Plexiglas, table tennis net, 274x152x76cm. The project was created in collaboration with Louis Kohlmann (Projektraum LOTTE - Land of the Temporary Eternity, Stuttgart).

Adam Słowik, Christian Lölkes & Peter Weibel / ALPHABET SPACE

2017. Dynamically three-dimensional notation, computer-based installation.

5 Julien Prévieux / WHAT SHALL WE DO NEXT? (SEQUENCE #2)

2014. Projection. VO (English). HD video, color, sound, 16:47min.

• Karin Sander / XML-SVG CODE / SOURCE CODE OF THE EXHIBITION SPACE

2010/2019. Oracal 638, vinyl matte, tricolor. 8x10m.

Z Rafael Lozano-Hemmer / LEVEL OF CONFIDENCE

2015. Face-recognition algorithms, computer, screen, webcam. FullHD screen.

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Emma Charles / WHITE MOUNTAIN

2016. Projection. 16 mm film transferred to HD video, color, sound, 20min.

9 James Bridle / AUTONOMOUS TRAP 001

2017. Installation. Ditone archival pigment print, 150x200cm. Courtesy of NOME, Berlin.

10 Arrieta/Vázquez / THE AGE OF FICTION

2010-2011. Electronic display, consisting of 12 displays of 7 segments, 12 eagle plates, arduino, methacrylate plates and laptop. 50x70cm.

11 Claire L. Evans / 2001 100011

2011. Print Screenplay. 21,6x27,9cm.

12 UBERMORGEN / CHINESE COIN (RED BLOOD)

2015. Mixed-media installation. Full HD video with Dolby Surround 5.1, red bench.

OPEN SPACE

This open space is designed for public activities such as workshops, conferences, round tables or meetings related to the open source theme.

The space's feature is that anyone can shape its content: the exhibition provides the infrastructure and the public fills it with ideas. An experimental space, alive and open to the public.



MAP 2. ATRIUM OF CULTURES

Floor 0



1 Varvara & Mar / BINOCULARS TO... BINOCULARS FROM...

2013. Interactive telematic installation. Custom-made software, streaming servers, wooden structure, computers, screen, cameras, urban screen or projection, electronics. Interaction station: 160x67x60cm.

2 Bernd Lintermann & Nikolaus Völzow / THREE PHASES OF DIGITALIZATION

2017. Interactive installation with polarized light and augmented reality technology. Concept: Bernd Lintermann, Nikolaus Völzow / Software development: Nikolaus Völzow / Design: Matthias Gommel / Technical collaboration: Jan Gerigk, Manfred Hauffen / Inspired by: Peter Weibel.

3 Rafael Lozano-Hemmer / REDUNDANT ASSEMBLY

AUDIOGUIDE azkunazentroa.eus

2015. Computer, HD digital cameras, thunderbolt hub, code written in OpenFrameworks. Power: 800W on 110-220V. 75x65x15cm.

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4 Julien Prévieux / WHAT SHALL WE DO NEXT? (SEQUENCE #1)

2006-2011. Videoinstalation. HD video, colour, sound. 3:54min.

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c6 3b		7 a			b2 c6																											
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