

Virtual Reality Lab – Pacathon – Deep Space 8K – Radical Atoms

Festival@Ars Electronica Center

(Linz, September 5, 2017) The 2017 Ars Electronica Festival begins the day after tomorrow: Thursday, September 7th. At 12 locations throughout downtown Linz, 1,000+ artists, scientists, tech enthusiasts, entrepreneurs and social activists will present their futuristic projects and visions of the future, speak their minds at conferences followed by Q&A sessions, hold workshops, and give performances and concerts. A prime venue once again this year is the Ars Electronica Center. “Festival@Ars Electronica Center” subsumes multifarious events including the launch of an interactive Pacathon, the debut of a Virtual Reality Lab, a special lineup of screenings in Deep Space 8K, and the addition of three great new works by the MIT Media Lab to the RADICAL ATOMS exhibition.

The Pacathon

PACATHON is an open innovation lab for discussing future play and future society via prototypes exploring new utilizations of PAC-MAN, a video game algorithm that was released by BANDAI NAMCO Entertainment Inc. (formerly NAMCO) in 1980.

This world-famous game still has millions of fans worldwide. PAC-MAN attracts not only traditional - gamers but also a new wave of the young and young-at-heart who are captivated by its simple rules, sophisticated game system, cute, colorful character designs, rhythmic background music, the unique standard setups, and the comical transition sequences between the respective levels. In many ways, PAC-MAN was the first avatar to create a bridge for communications between a coded, virtual world and us human beings. Over the course of the hype surrounding it, approximately 400 different types of merchandise were released and PAC-MAN became a social phenomenon embedded in the human psyche as a symbolic icon representing game culture and its social impact. Now, if our aim is to get PAC-MAN off the screen and into the real world, then what characteristics must it necessarily display? Precisely this is the question posed by PACATHON to a new generation of PAC-MAN enthusiasts. This project is being staged jointly by Bandai Namco Group, Ars Electronica and Hakuhodo to encourage festivalgoers to explore the potential of innovative gamification.

The New VRLab

Virtual reality, augmented reality and mixed reality, total immersion in virtual worlds and superimposing data onto our reality—everybody’s been talking up these concepts and ideas once again. The enthusiasm that accompanied the dawn of this new high-tech age in the 1980s and '90s is back, whereby the technology deployed in today’s data glasses (head-mounted displays) seems to finally be able to live up to the visions that preceded it. So it’s no coincidence that VR, AR and MR have become a playground of multifarious pursuits: the gaming sector and film industry, applications in the educational field and tourism market, works of art and architecture, the creative economy, performance and the theater. The Ars Electronica Center’s new VRLab provides an overview of the latest trends and gadgets in the VR, AR and MR fields. As always, the accent is on a hands-on experience—everyone who’s ready, willing and able can, may and should immerse themselves in virtual realms to their hearts’ content. Plus, the VRLab gives an insightful account of the history of these

technologies' development. What did 18th-century spatial illusions look like, how did we progress from the stereoscope to the Oculus Rift, and in which directions will VR and AR be advancing in days to come?

TRAINING 2038 / Kitchen Budapest (HU)

TRAINING 2038 plays out a dramatic 3-D scenario in which a chatbot assumes the role of an extraterrestrial life form and a human user is questioned about human thoughts and actions. In the course of this interrogation, the user must function as humankind's representative and answer on our behalf. The ensuing interaction serves as a metaphor for machine learning.

Tilt Brush / Google (US)

Google's Tilt Brush is a virtual reality painting and modeling program. Teaming it up with the HTC Vive VR system lets the user render and design in 3-D space. Manipulation of the controller in the form of a paintbrush proceeds intuitively and precisely.

Donau Augmented 360 / Netural GmbH (AT), Responsive Spaces GmbH (AT), Amago GmbH (AT), WGD Donau Oberösterreich Tourismus GmbH (AT)

DONAU AUGMENTED 360 is a prototype for which Austria's Danube Basin was filmed from a bird's-eye view with 360° cameras and the footage was supplemented with information especially for tourists—i.e. points of interest, opening hours and recommended upcoming events. Donau Augmented 360 was developed by Neutral (digital agency), Responsive Spaces (multimedia production), Amago (film) and WGD Donau Oberösterreich (regional inbound tourism promoter).

Austria 360° KHM interactive / Österreich Werbung (AT)

Austria's inbound tourism promotion agency used HTC Vive technology to develop an interactive virtual-reality tour of Vienna's Kunsthistorisches [art history] Museum. This project, one of Europe's first virtual-reality documentaries with user-determined storytelling, superbly demonstrates the possibilities of an interactive video documentary in virtual reality. The interactive elements enable visitors to use eye control to navigate through the museum and access additional information about the works of art they behold. Thanks to innovative editing technology, high-resolution 360° video sequences were combined with 3-D audio narration in a way that delivers an immersive experience in images, text and even sound. Users can select from among three narrative strands, and thus determine the storyline themselves.

Morphogenesis / Can Buyukberber (TR), Yagmur Uyanik (TR)

Morphogenesis is the biological process that causes an organism to develop its shape. As a virtual-reality piece, "Morphogenesis" consists of continuous transformation of fundamental geometrical patterns and uses them as the building blocks of immersive spaces. It embodies the systems that produce the complexity we encounter in the living world. Exploring the idea of geomorphology, mathematics and understanding the world, "Morphogenesis" requires the audience to be sentient, not just receivers. It invites the viewer to a poetic and sensational world where space becomes infinity, the primal sense of the immaterial world is experienced, and the process of creation is reevaluated. "Morphogenesis" is one of the outstanding animated works being screened at the Ars Electronica Animation Festival.

Advent VR / Sebastian Maurer (AT), Upper Austria University of Applied Sciences'
Hagenberg Campus (AT)

ADVENT VR lets you assume control over a drone that landed—or crash landed—on a remote planet. This is the beginning of a journey of discovery during which the user analyzes extraterrestrial flora and fauna, and slowly but surely figures out what the drone's original mission was ...

Fight / Memo Akten (TR/UK)

FIGHT is a virtual-reality artwork in which the viewer's two eyes are presented with radically different images, resulting in a phenomenon known as binocular rivalry. Presented with rival signals, the conscious mind "sees" an unstable, irregular, animated patchwork of the two images, with swipes and transitions. The nature of these irregularities and instabilities depends on the viewer's physiology. Even though everybody is presented with exactly the same images in this work, everyone's conscious visual experience will differ. Nobody is able to see the entirety of the "reality" before them. FIGHT is part of a broader line of inquiry into self-affirming human biases, the inability to see the world from others' point of view, and the resulting social polarization.

Festival Lineup in Deep Space 8K

Deep Space 8K is one-of-a-kind worldwide; it's the Ars Electronica Center's premier attraction. Here, festivalgoers will enjoy a special series of screenings showing off the breathtaking imagery that this state-of-the-art technology is capable of.

The Virtual Reconstruction of the Linz Synagogue / René Mathe (AT), Ars Electronica Futurelab (AT)

One of the many Jewish houses of worship set ablaze by the Nazis on *Kristallnacht*, November 9-10, 1938 was the synagogue of the Linz Jewish Community. In conjunction with work on his master's thesis, René Mathe created a virtual reconstruction of that synagogue to enable people today to envision the former center of Jewish life here. His work, in turn, served as the basis of the Ars Electronica Futurelab's 3-D visualization, which enables visitors to Deep Space 8K to take a virtual tour of the old Linz synagogue.

The Memories of Borderline / CyberRäuber (DE), Schauspiel Dortmund (DE)

This is a unique merger of theater and virtual reality that creates a new virtual, immersive and interactive space. While the three-hour play overwhelms its audience with a hail of simultaneous information, action, sound, text and performance, the VR scenery tells a story of memories and transience. From the moment one enters, the walls and textures show increasing traces of decomposition. In the background, there is atmospheric noise of music and texts, video scenes that once might have taken place here. Scenes are displayed on the screens—life in all its facets in contrast to the transience of the virtual world. THE MEMORIES OF BORDERLINE creates a new, hybrid form of art—a combination of visual art, media art, gaming and performance art. It explores the potential of theater working with new technology, creating an innovative form of narration in theater in which users become their own narrator.

Grasping / Manuela Macedonia (IT/AT)

For adults, learning a foreign language is a task associated with great difficulty and often crowned with scant success. This series of scientific experiments conducted by Dr. Manuela Macedonia and her staff at Johannes Kepler University Linz in cooperation with the Ars Electronica Center and the Catholic University of the Sacred Heart Milano is investigating learning a language in a virtual setting. In Grasping, the second experiment in this series, participants are immersed into a 3-D underwater realm in Deep Space 8K at the Ars Electronica Center. Test subjects see virtually projected everyday objects and touch them with their hands—that is, they literally grasp them (in both senses of the word). This specific action supports the brain in memorizing the foreign language's term for the object. This series of experiments is meant to make a long-term contribution to developing learning environments for mobile devices.

Best of Animation Lab—Tagtool / OMAi (AT), u19 – CREATE YOUR WORLD (AT)

Drawing and sketching—with Tagtool, anyone can animate quickly and easily. Tagtool transforms a tablet into a drawing board for spontaneous visual expression. Festivalgoers can try it out in the Open Lab at u19 – CREATE YOUR WORLD. Making its public debut is the new Tagtool update that was tested in conjunction with the 2017 CREATE YOUR WORLD TOUR in Malta, where it was tested by 200+ students. The results will be presented in Deep Space 8K.

Eurogym Space Debris / Europagymnasium Baumgartenberg (AT)

EUROGYM SPACE DEBRIS makes collecting cosmic garbage a competitive challenge. Each player is issued a spaceship; then they see who can gather the most rubbish floating around in an asteroid belt. The project's mission is to raise awareness of the growing problem of space debris, though not by inducing a state of collective melancholy; the approach here is gaming fun produced by a program developed especially for Deep Space 8K at the Ars Electronica Center. Maybe future players will find a solution to this very real problem. It remains to be seen whether the creators and the players aren't indirectly contributing to the space-junk debacle!

Experimental / Jürgen Hagler (AT)

This program impressively demonstrates new and innovative approaches in current digital filmmaking at the interface of art and science—e.g. nature and bio-tech studies, morphogenesis, experiments with architecture and perception. Jürgen Hagler (AT) presents works by Quayola (UK), Andy Lomas (UK), Hugo Arcier (FR), Boris Labbé (FR), Casey Reas (US), Maxime Causeret (FR) and Reinhold Bidner (AT).

FAT #2 DE/MATERIALIZE / Fashion & Technology (AT)

Fibers, tissue, bodies de/materialize between real and virtual space. New surfaces and materialities evolve from bio-plastics or desert plants; are welded, etched or boiled. Material and intangible bodies challenge our imagination. Interfaces between the body, attire and space designed by Fashion & Technology students are staged in high-resolution images, stereo videos and a live performance.

Disenchantment Space / Atsushi Tadokoro (JP)

In a society pervaded by artificial intelligence, a code is hidden from people. Even without grasping the meaning of the code, we perceive it as a form of magic that produces new results by deploying huge

quantities of data and broad parameters. Through his work, Atsushi Tadokoro wants to unravel this magic by reversing the relationship between the code and the human being. DISENCHANTMENT SPACE transforms Deep Space 8K into a huge programmable space. Participants who enter Deep Space are transformed into objects that constitute the program. The objects then behave as program codes that generate sounds and images while interacting with each other.

Next Generation JKU / Johannes Kepler University Linz (AT)

Johannes Kepler University's faculty includes outstanding research scientists whose work is quoted in some of the most highly respected scientific journals worldwide but in their homeland, Austria, they're hardly known. So, who are these brilliant young Upper Austrian scientists and what are they performing research on? NEXT GENERATION JKU, a series of talks staged jointly by Johannes Kepler University and the Ars Electronica Center, showcased these outstanding young scholars.

Hisn al-Bab / Dr. Pamela Rose (UK)

Though hardly known today, the military outpost Hisn al-Bab played a significant role in Egyptian history. This frequently rebuilt and expanded fortress located in the border region between Nubia and Egypt became a political hotspot at the very end of Roman times. The ruin is as spectacular as its setting opposite the Temple of Philae high up on the eastern shore of the river south of the Aswan Dam, its walls preserved to a height of eight meters. Researchers used laser scans to produce an impressive 3-D documentation that enables laypeople to envision everyday life in the ancient fortress of Hisn al-Bab.

Expanded Abstractions / Max Hattler (DE)

Max Hattler creates impressive abstract animated films. In Deep Space 8K, he'll present an overview of his work including COLLISION (2005), his abstract classic about the war on terror, and HEAVEN AND HELL (2010), the looping diptych inspired by Augustin Lesage's spiritualist visions.

ARTUR: Autonomous Robot Playspace / Quantum Reboot (AT), Playful Interactive Environments (AT)

Although robots and autonomous systems are increasingly common within the domains of industry and science and they are now slowly but steadily conquering the backyards and roadways of urban civilization, the vast majority of humankind has very little experience actually interacting with such technology. Enter ARTUR: Autonomous Robot Playspace, an interactive environment featuring a full-scale, three-dimensional virtual robot. Developed specifically for Deep Space 8K at the Ars Electronica Center, ARTUR utilizes laser tracking and mobile devices to facilitate a playful group-based interaction between a simulated robotic arm and a large audience. This project produced jointly by the Playful Interactive Environment research group and the Quantum Reboot developer collective provides a game-based environment to collectively explore the perception of autonomous robots in our society.

Bird Song Diamond / Victoria Vesna (US), Charles Taylor (US), Takashi Ikegami (JP), Hiroo Iwata (JP), Reiji Suzuki (JP)

BIRD SONG DIAMOND is a site- and habitat-specific interactive installation based on long-term research (2011-present) involving multifaceted, interdisciplinary perspectives—uniquely connecting the nodes of evolutionary biology, artificial intelligence and life, spatial sound, mathematics and

mechatronics. The version developed especially for Deep Space 8K features bird songs from Austria and Japan, and reflects the unique relationship of these two very different cultures. Audiences are engaged by attempts to mimic bird songs and participate as a group with male to female vocalizations. The collective behavior influences the flocking, images and sound—all working in real time.

VH Award / HYUNDAI MOTOR GROUP (KR)

The VH Award's purpose is to discover promising but relatively unknown Korean artists creating media art. It seeks to support the art-making process of these talented young media artists but also to help them gain international recognition. In addition, the VH Award introduces a new genre of media art to the public—this centers on innovative ways of communicating information that ultimately promote a more tightly-knit field of art. The finalists will have the opportunity to display their works of art via the spectacular media wall located at the Hyundai Motor Group University's Mabuk Campus.

CAPILLARIES CAPILLARIES / Tadej Droljc (UK)

This is an audiovisual composition based on a non-hierarchical and bi-directional relationship between sounds and images in real-time. The piece does not represent a visualization of music or sonification of an image but rather a tangle of audiovisual interactions. The work explores the idea of an audiovisual time object in which shape, time and sound interact with one another. The main focus of the piece is on the structures that emerge from the force field that pulls such objects towards two opposite extremes—tidy pre-composed order or generative chaos. The situation reflects the id-ego-superego model, which represents the conceptual background. Just as the ego is established in between the two groups of conflicting forces that constitute, distort, constrain or disperse our subjectivity, so too is the material of CAPILLARIES CAPILLARIES. Throughout the piece, the behavior of one and the same material is observed from different perspectives.

ABYSMAL / VOID (TR)

Perception is the procedure of acquiring, interpreting, selecting and organizing sensory information. Perception presumes sensing. In people, perception is aided by sensory organs. In the area of artificial intelligence (AI), the perception mechanism puts the data acquired by sensors together in a meaningful manner. Machine perception is thus the ability of a computer system to interpret data in a manner that is similar to the way humans use their senses to relate to the world around them. Inspired by the brain, deep neural networks are thought to learn abstract representations through their hierarchical architecture. Using an artistic approach to interpret the learning mechanism of an AI-based projection-mapping technique, we challenge the dominant perception system of artificial intelligence as practiced today, which is purely objective and reductionist.

Sanbaso / Mansai Nomura (JP), Daito Manabe (JP), NHK (JP)

“Sanbaso” is an 8K documentary film dedicated to the ancient Japanese divine dance of the same name. Actor Mansai Nomura explores the dance's organic beauty with his own expression. Media artist Daito Manabe sought to analyze Mansai's motion mathematically and visualize it using extremely high-resolution images as a background to the stage. The 8K production was made by the NHK group, a public media corporation with the largest TV network in Japan.

Austronomy / Florian Voggeneder (AT)

Austrian astronaut Franz Viehböck's liftoff to the MIR space station on October 1, 1991 was accompanied by a euphoric celebration of this country's giant leap into the cosmos. 25 years later, Florian Voggeneder boldly goes on a photographic mission to document the implications of this miniature Space Age. Obscure artifacts and unworldly landscapes, space enthusiasts and research facilities converge in a narrative at the cusp of fiction and folklore that explores the possibility of an alpine space program. In Deep Space 8K, the artist elaborates on his project's progress to date and participation in scientific space simulations.

Interludium A, Isang Yun 3 Etudes for Piano, Philip Glass / Maki Namekawa (JP), Cori Olan (AT)

Two birthdays constitute the background of these pieces' selection—the 100th of Insang Yun, the Korean composer who died in 1995, and Phillip Glass' 80th. "Interludium A" was created in 1982, two years after the democracy movement in Gwangju was crushed. This was a matter of profound concern to Isang Yun who, in the late '60s, had himself been victimized by the political despotism of the military regime in power at the time. The real-time visualization of this piece has its point of departure in visual associations with the sheet music, and rises up into a complex geometric structure, the individual elements of which are then infused with dynamic movement by parameters derived directly from the live sound of the piano—like a huge high-rise complex or construction plans for a futuristic urban machine that, with passages becoming softer and softer, descends into a dark nocturnal mood, from the depths of which repeatedly emerge tonal colorations and elements evocative of Asian calligraphy. Three of Philip Glass' "20 Etudes for Piano" will be performed by Maki Namekawa as a sort of teaser for her big solo concert on Monday.

Pitoti Prometheus / Frederick Baker (AT/UK), Marcel Karnapke (DE)

Pitoti Prometheus is a totally new VR project in which a 360° view brings to life ancient rock art, so-called petroglyphs. The figures, which extend upwards, as it were, from the rocks in the Valley of Valcamonica, are called *pitoti* (little dolls) in the local Lombard dialect, are protected as a UNESCO World Cultural Heritage site. The story they tell is a myth: young demigod Prometheus rebels and decides to bring humankind to life: "They may be bound here by their lifelessness, but they are free and I feel their freedom!" He releases humankind from their ago-old chains. The animated *pitoti*—humans, birds and animals—celebrate their animation by dancing, plowing and hunting until they're ultimately subjugated by the Romans.

A Flurrytale / Narrator's Lowdown (AT)

Four artists from three countries, two art genres, one shared theme: reality vs. fantasy—these opposites have always divided people. The artists bring together their observations from their past and present surroundings, and further translate these conclusions on stage through movement and image. The constant visual storm and the rapid tempo of our time are also taken as impulses for the movement language and visual outlook of the piece. From still and rigid to fluent and wild, the imagery of reality and fantasy moves through the piece like a hologram that is fluid in time and space. During the performance the artists explore what happens if these opposites, reality and fantasy, are

merged into each other like two holograms and meld into one. A FLURRYTALE was honored as Best Dance Piece at the 2016 Taipei Fringe Festival.

iOTA / Ouchhh (TR)

Can machines totally replace humans? iOTA is a real-time performance that enacts a struggle between human and machine. The audience witnesses an extraordinary audiovisual confrontation of real artists and artificial intelligence that acts like an artist on the stage.

NOIZE Etudes / SpectroDuo (PL/IR)

NOIZE Etudes is a live multimedia performance focusing on micro-sounds caused by binary operations in multiple layers of music coding. In general, with their sound, the etudes drag you inside the code, giving you the feeling of being lost between the numbers. That feeling grows when you experience the sounds being transcribed into the binary video projections, the unlimited uncountable pattern of blacks and whites.

Paradise “Growth” in Zero Gravity / Yoichiro Kawaguchi (JP)

8K resolution was originally developed for a new television system: ultra-high-definition TV. Yoichiro Kawaguchi’s aim, however, is not to use 8K strictly as a TV system but, above all, as a new means of artistic expression and as a medium for presenting art. Thus, what he’s doing is precisely what artists have always done—assessing new technologies in terms of their suitability as forms of artistic expression.

HOMO DIGITALIS—How much longer will we still actually be human? / Christiane Miethge (DE), Nils Otte (DE)

Will we all, at some point, have virtual friends, enjoy sex with robots more than making love to a real person, and hack our own body? “Homo Digitalis” is a Web series and, simultaneously, a scientific experiment conducted by BR, ARTE, ORF [TV stations] and the Fraunhofer Institute on the ultimate future question: What is the Digital Revolution doing with us human beings?

RADICAL ATOMS Updated

The RADICAL ATOMS exhibition that premiered in September 2016 showcases visionary works by the Tangible Media Group at the Massachusetts Institute of Technology. Professor Hiroshi Ishii (JP) and his staff present prototypes that transfer digital information—bits—into physical, tangible particles—atoms. The upshot: digital and physical worlds merge, the interfaces between humans and machines are redefined, and new high-tech materials emerge. On the occasion of the 2017 Ars Electronica Festival, scientists on Hiroshi Ishii’s are bringing three new projects to Linz.

CILLIA / Jifei Ou (CN), Nikolaos Vlavianos (GR), Hiroshi Ishii (JP/US)

Cillia is a means of 3-D printing hair structures. This technical solution constitutes a design innovation that will simplify the production of synthetic fur. There are some things that, up to now, have required a huge amount of computational time and power to generate with a 3-D printer. They include hair, fur and other structures with dense arrays of extremely fine elements. This new 3-D printing software lets users define the angle, thickness, density and height of thousands of hairs in just a few minutes.

kinetiX / Jifei Ou (CN), Jannik Peters (DE), Karl Willis (US), Hiroshi Ishii (JP/US)

kinetiX is a new, transformable material featuring a design that resembles a cellular structure. It consists of rigid plates or rods and elastic hinges. These modular elements can be combined in a wide variety of ways and assembled into multifarious forms. What the resulting kinetiX structures look like and what characteristics they possess are determined with the help of computer-supported simulations. This makes it possible to derive mathematical models that contain the physical properties and design attributes of the material. Various configurations of the kinetiX structure are then tested by architectural software and stored to a library of various design options. Once such a formal archive has been set up, kinetiX can quickly and easily be configured into a vast array of architectural structures.

aeroMorph / Jifei Ou (CN), Nikolaos Vlavianos (GR), Hiroshi Ishii (JP/US)

aeroMorph investigates how materials stacked in multiple layers can be used to make self-folding origami structures. This project works with a programmable bending mechanism that triggers shape-changing behavior in fabric, paper and plastic. With a specially developed software tool, the basic structure of an origami form can be computer-generated. The tool then simulates the material's transformation into the finished origami shape and exports this information as a digital fabrication file. A custom-made head of a heat-sealing machine is mounted on a conventional 3-axis CNC machine that precisely cuts the geometric shapes of the origami structure out of the material. This technology has been conceived for use in manufacturing toys and interactive wearables, and in the packaging industry.

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