

# **ANIMATED URBAN SURFACES: SPATIAL AUGMENTED REALITY IN PUBLIC DISCOURSE**

MARTINA TRITTHART\*

\* FH Joanneum - University of Applied Sciences (Austria)  
University of Applied Sciences Burgenland (Austria)

**Martina Tritthart** works as an artist, curator, lecturer, and researcher in Austria. Her work includes installation and media-art. It has a prominent focus on light as a medium, related to the perception of spaces. She completed her Ph.D. in Architecture on "Light Spaces - Spatial Models of Perception" at the University of Technology in Graz.

**Corresponding Author**

Martina Tritthart

[martina@tritthart.at](mailto:martina@tritthart.at)

FH Joanneum

University of Applied Science

Department of Media & Design

Alte Poststraße 152

8020 Graz

Austria

FH Burgenland

University of Applied Science

Department of Information

Campus 1, 7000 Eisenstadt

Austria

Paper submitted: 8<sup>th</sup> March 2021

Accepted for Publication: 7<sup>th</sup> October 2021

Published online: 17<sup>th</sup> December 2021

## Abstract

Today's projection art on public surfaces developed from the mutual approximation of painting, architecture, and lighting during centuries. The terms "Spatial Augmented Reality" (SAR) and "projection mapping" describe mostly temporary large screen projections on urban surfaces. The façade architecture becomes the screen for the content, mostly projected 2D and 3D animations. In essence, many of these artworks generate illusionistic clips deriving from the existing façade structure, allowing reality and fiction to merge audio visually. Artists, architects, curators, and institutions are increasingly aware of their responsibility related to this form of the mediatization of architecture, as shown, for example, by the Brazilian artist group Visualfarm. Their members approach their work as a counterpoint to the commercialization of public space in its appropriation by industry, propaganda, and advertising. But on the other hand, they also make a living from commercial assignments.

Artists and architects often see themselves as pioneers and experimental researchers for possible developments in the coming digitized cities. By presenting various examples by selected artists like Corrie Francis Parks, Pablo Valbuena and Robert Seidel, the role of animation in connection with an alternative approach to the concepts of augmented realities within this process of social and urban evolution will be discussed. These artists try to integrate digital content into the cityscape in a harmonious sense.

**Keywords:** Spatial Augmented Reality, Urban Media Art, Projection Art, Projection Mapping, Generative Art, Architecture, Animation, Public Space, Spectacle, Multimedia Events, Anthropocene, History, Social Awareness, Participation, Interaction

## 1. Introduction

In 2018, the Atelier des Lumières was opened in Paris, entirely dedicated to the immersive spatial experience with digital projections and planned from the beginning to be impressive for the public. 3,300 m<sup>2</sup> of surfaces, ten-meter-high walls, and floor and ceiling are projected on with favorite images from art histories, such as works by Gustav Klimt, Van Gogh, or Friedensreich Hundertwasser, as well as more contemporary pieces. Immersion is the key to virtual reality. "Immersion often happens through entering a virtual space, which captivates us due to its increased presence and lets us forget reality for a moment,"<sup>1</sup> (Lootsma, 2013, p. 66) says Dutch architecture critic and historian Bart Lootsma. The *Atelier des Lumières* is at the current end of the development of large illusionary spaces that are intended to integrate and entertain people as a whole. It started in antiquity, with the frescoes in Pompeii, the baroque ceiling frescos, led to the panoramas of the 19th century, the IMAX cinemas and CAVEs of the 20th century and large-format projection mappings in the 21st century (Grau, 2003, p. 349).

With the electrification of urban spaces at the beginning of the 20th century, it became possible to expand the interior space into the nocturnal urban environment, reminiscent of the illuminated stage space in the theatre. This process also included monuments and representative buildings illuminated with powerful projection spotlights. At the beginning of the 20th century, neon advertising signs and glowing lettering appeared, which, together with the bright shopping windows and canopies in front of theatres, cinemas, and other buildings, attracted the attention of passers-by. The illumination with lightbulbs and neon light on the one hand, and the use of simple animations in the form of moving figures, logos, and lettering on the other, quickly had an impact on the commercialization of public spaces. This led right up to establishing

large media façades at the end of the 20th century, like the Times Square in New York impressively demonstrates.

In connection with the media presentation of architectural façades and extensive displays, large-screen projections are used, which in addition to pure video projections often also contain projection mapping.

The architectural façade has always had the function of a communication medium, to make the underlying structure or the representational status legible. The media theorist Lev Manovich refers to Robert Venturi's theories that architecture can be viewed as an iconographic information surface (Manovich, 2006). In the course of its history, traditional architecture used ornaments, façade figures and visual narrative elements for the exchange of information, as demonstrated, for example, by the richly designed façades, with their numerous sculptures and the colorful depictions of the history of the Bible, in the windows of Gothic cathedrals.

Architecture and fine arts are constantly combined to form new, innovative manifestations that can be differentiated into two basic types: temporary art projects and permanent structures. In addition to the painterly illusion techniques and the invention of electric light, the projection techniques in theatres, from shadow theatre to the phantasmagorias of the 18th and 19th centuries, and the innovative experiments and installations of the world exhibitions, in particular, the *Poème électronique* by Le Corbusier, Iannis Xenakis and Edgar Varèse 1958 as well as *Glimpses of the U.S.A.* and *Think* by Charles & Ray Eames 1959, count as forerunners of contemporary multimedia installations and large-screen projections. The direct precursors include the *Reflektorische Lichtspiele* by Kurt Schwertfeger and Ludwig Hirschfeld-Mack from the early 1920s, the cybernetic experiments by Nicolas Schöffer,

<sup>1</sup> „Immersion geschieht vielfach durch das Eintauchen in einen virtuellen Raum, der uns aufgrund seiner gesteigerten Präsenz gefangen nimmt und die Realität für einen Moment vergessen lässt“ (Lootsma, 2013, p. 66).

representatives of expanded cinema as well as projects by the Zero Group, Julio Le Parc, and other representatives of kinetic art.

## 2. Early precursors of electronic multimedia-environments for a big audience

An early example of the hybridization of a real and a virtual imaginary world is Le Corbusier's Philips pavilion at the 1958 Brussels World's Fair. Together with his colleague and composer Iannis Xenakis, the architects designed the architectural shell, a self-supporting reinforced concrete structure made of hyperbolic paraboloids (Fig. 1) for one of the first computer-based multimedia installations (Lukes, 1996, p. 10).



Fig. 1 *The Philips Pavilion at the Brussels World's Fair 1958.* Photo: Wouter Hagens, CC BY-SA 3.0.

Originally, the total work of art was supposed to combine architecture, light, color, film, sound, and rhythm under the direction of Le Corbusier, but due to time constraints, the visual level had to be decoupled from the sound level. Le Corbusier invited the French composer Edgar Varèse to develop a specific music composition in the Philips studio. Le Corbusier

collected photos, illustrations, and short film clips in several museums around the world. In collaboration with Jean Petit, Le Corbusier put the pictures together and handed the collection, including the directing instructions, to the filmmaker Philippe Agostini, who turned them into the eight-minute black and white film. Structured in seven sequences, the film tells the evolutionary history of mankind from the beginnings of civilization up to the 1950s. In addition to a few other very short film scenes, mainly photos and drawings were used for this animated photo film. The two opposite film projections (*écrans*) in the format 8x20 meters moved along the curved walls and thus the appearance of the projection changed (Lukes, 1996, p. 72).

Different mood lightings (*ambiances*) lasting 2 to 25 seconds were referring to the image content and coloring the white areas of the projections (Lukes, 1996, p. 13). Two additional films supplemented the large-screen projections. These smaller projections were called *tri-trous*: plain colors and images embedded in a film of black images. Mirrors were used for steering the projections (Lukes 1996, p. 14). Two 3D figures, a geometric form and a mannequin were painted with fluorescent color and illuminated with UV light at certain intervals. Other lighting systems were added to the complex lighting dramaturgy. The cave-like dark interior with the curved inner walls made of reinforced concrete and asbestos played an essential role both for the distortion of the projections and for the spatial effect as well as acoustic quality of the sound installation (Lombardo et al., 2009, p. 32).

Edgar Varèse composed and arranged a site-specific surround sound that moved through the room via 350 loudspeakers. Light, image and sound, but also the flow of visitors, were controlled in such a way that up to 500 people per event could be channeled through the pavilion in eight minutes (Lombardo et al., 2009, p. 27).

In her essay, the art historian Katie Mondloch describes the parallels she sees between Le Corbusier's *Poème électronique*

and today's media art: „The *Poème électronique*'s immersive environment strove to create a sense-overloaded observer who would experience a spatialized virtual event.”(Mondloch, 2004, p. 57) For Mondloch, the decisive factor is that this early example of a programmed and computer-controlled multimedia event was designed chronologically. The experience of Le Corbusier's *Poème électronique* was determined by its limited duration of eight minutes plus intro- and exit-music as well as an announcement in the beginning of the tour through the pavilion. Film, sound, and lighting design was strictly controlled and timed for the audience. Katie Mondloch sees this as the difference to other examples of multimedia events, happenings or Fluxus performances since the 1950s that were organized non-hierarchically.

To this end, the highly controlled 1958 *Poème électronique* masterminded by Le Corbusier seems a more fitting prototype for current immersive technological artistic environments than the more frequently suggested precedents of the 1960s experimental, largely non-hierarchical art and media practices. (Mondloch, 2004, p. 61)

In his multimedia events in the *Movie-Drome* in the 1960s, Stan VanDerBeek pursued a multi-sensory, non-hierarchical strategy of an experimental spatial arrangement for the reception and perception of visual and auditory media. Mark Bartlett underlines VanDerBeek's socio-political and anti-capitalist approach to art. "He understood the technoartist's role

as fundamentally political – to challenge the visual revolution at its source, to bring critique through practice to the mechanisms of image architecture, production and distribution" (Bartlett, 2010, p. 117).

The experimental filmmaker Stan VanDerBeek, who studied architecture and art, turned a grain silo in Stony Point, New York, into a performance space for multimedia live shows in 1965. The audience lay on the floor, with their feet to the center of the room, watching multiple projections of animation and live action film sequences, videos, slides, and computer graphics in constantly changing combinations (Museum Moderner Kunst Stiftung Ludwig Wien & Michalka, 2004, p. 41).

Unlike the Philips pavilion, the *Movie-Drome* was not a commissioned work, and its only purpose was to change art perception. It enabled a collective experience of different atmospheric spaces in a subtle way.

### 3. Architecture and animation

While allegories were drawn between architecture and film in the 20th century and a kind of affinity was attested<sup>2</sup>, this applies even more to architecture and animation in the 21st century. Whereas Le Corbusier created an audio-visual art-piece and the specific spatial situation to experience a *Gesamtkunstwerk*, the use of animation in architecture and the mutual impact of virtual and real world also changed the designing

2 The Finnish architect and critic Juhani Pallasmaa analyses architectural imagery in films by Andrei Tarkovsky, Michelangelo Antonioni, Stanley Kubrick, and Alfred Hitchcock, including framing, symmetry, balance, vectors, and movements. The author examines the connection between architecture and architectural expressions in film with paintings and contemporary installation art in relation to human emotions. Pallasmaa J. (2001). *The Architecture of Image: Existential Space in Cinema*. Rakennustieto Publishing The book "Architecture and Film" discusses the mutual influence of film and architecture, divided in three parts, the first investigates the image of the architect in film, the second has a focus on set design and the presentation of architecture in film and the third analyses the interpretation of built environments by filmmakers. Lamster M. (2000). *Architecture and Film*. Princeton Architectural Press.

Further literature:

Albrecht, D. & Eu, R. (Eds.)(1989). *Architektur im Film: Die Moderne als große Illusion*. Birkhäuser Verlag archithese 5.

D. (Ed.) (1999). *Film Architecture from Metropolis to Blade Runner*. Prestel Pub.

Schaal, H. (1996). *Learning from Hollywood. Architecture and Film*. Architektur und Film. Edition Axel Menges.

Weihsmann, H. (1995). *Cinetecture: Film. Architektur. Moderne*. PVS.

Weihsmann, H. (1988). *Gebaute Illusionen. Architektur im Film*. Promedia-Druck- und Verlagsges.m.b.H.

process itself in architecture. In his book „Animate Form“, the American architect Greg Lynn expanded the term animation in the context of architecture as a design tool in the late 1990s.

Animation is a term that differs from, but is often confused with, motion. While motion implies movement and action, animation implies the evolution of a form and its shaping forces; it suggests animatism, animism, growth, actuation, vitality and virtuality. In its manifold implications, animation touches on many of architecture's most deeply embedded assumptions about its structure (Lynn, 1999, p. 9).

Usually, architectural animation is used as simulation to explain an architectural design to a client, mainly using CGI. Greg Lynn questions animation not only as a drawing - and representation - but also as a design-tool for the creation of new shapes. Architecture is no longer just the static framework for a temporal experience: „Rather than as a frame through which time and space pass, architecture can be modelled as a participant immersed within dynamic flows“ (Lynn, 1999, p. 11). The use of animation in architecture influences not only its depiction but also its perception. Large-screen projections on facades imply animation techniques, which often resembles architectural 3D-structures and wire-frame models of the real surfaces. Real and virtual space merge into hyper realistic images.

The Spaniard Pablo Valbuena is an artist whose reduced imagery is reminiscent of technical architectural drawings. His interventions can range from minor modifications of existing architectural elements to large-format façade projections. Depending on the topic, the artist combines his different groups of works in series, such as the *Para-polis* series since 2007, which includes large-format, ephemeral video projections on significant buildings, monuments, museums, and universities. In 2008 Pablo Valbuena developed *Para-Polis [The Hague]* (Fig. 2) for the city hall in The Hague, built-in 1995 by the architect Richard Meyer, as part of the Today's Art Festival (Valbuena, 2021).



Fig. 2 and 3 Pablo Valbuena, *Para-Polis [The Hague]*, site-specific installation. Photo © Pablo Valbuena, courtesy of the artist, [www.pablovalbuena.com](http://www.pablovalbuena.com).

The most striking features of this building are its white façade surfaces, to which the artist responded directly. Valbuena's virtual sequences on the outside of the town hall were slow, subtle, and silent. No sound accompanied this purely visual work. The film began with simple white lines that traced individual physical elements and subsequently became white areas. These surfaces then formed an ornament. The brilliant white light recalling the effects on the façade in daylight gave the building a new appearance. From line to surface to space: imperceptibly to this gradual change, the audience interpreted the surfaces after a while as illuminated, three-dimensional bodies, on which the shadows developed a different dynamic and made the virtual kinetic façade elements appear deceptively natural (Fig. 3). In contrast to many projection-mapping projects that have been shown worldwide since then, Valbuena's virtual images are always in dialogue with the built reality and thus address the perception of architecture. The actual existing structures are part of the animations, which then give the architecture a new narrative.

Animation researcher Dan Torre describes a site-specific animation as a "situated animation" (Torre, 2015, p.199) that is uniquely connected to the actual space. This form of production requires an exact construction and a projection that must be carried out even more precisely the more subtle the transition from physical reality to digital virtuality should occur.

In *Quadratura* (Fig. 4) in the Matadero in Madrid 2010, Pablo Valbuena extended the windowless exhibition space in the former slaughterhouse into an apparent infinity using the means of central perspective. The artist framed the darkroom with its many supports and arches with a rectangle in which he inscribed alternately different perspective images with lines and surfaces from white light. The work's title refers to the painting technique in the Baroque period of the same name, which was popular for creating illusionistic room extensions.

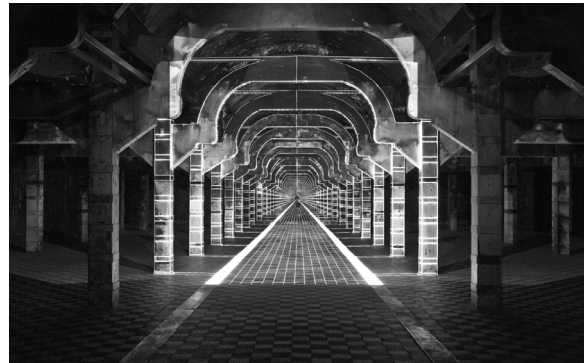


Fig. 4 Pablo Valbuena, *Quadratura*. 2010, Abierto x obras, Matadero Madrid, site-specific installation. Photo © Pablo Valbuena, courtesy of the artist, [www.pablovalbuena.com](http://www.pablovalbuena.com).

#### 4. Society of the spectacle

Mainly due to the continuous development of bright high-performance projectors, it is now possible to use extensive areas and make rather uneven façade structures disappear almost completely behind the presented image content. Large-screen projections have a similarly stunning effect as fireworks and laser shows. While large companies and communities praise the potential economic benefits as marketing-tool, city planners and scientists warn against the "digital proliferation"<sup>3</sup> (Pop et al, 2012, p.15) due to inherent monetary interests in urban spaces.

In 1967 the philosopher and artist Guy Debord criticized Western society as a society of the spectacle, which subordinates all of life and art to this economic doctrine.

The spectacle in society corresponds with the concrete creation of alienation. Economic expansion is mainly the expansion of that particular industrial production. [...] The person separated from his product produces more and more powerfully all the features

3 Dr. Gernot Tscherteu quoted from Pop et al. (2012, p.15).



of his world and thus finds himself more and more detached from his world (Debord, 2013, p. 27)<sup>4</sup>.

According to Debord, this alienation manifests itself in all areas of society, especially in arts and culture. Spectacular, large, and costly 3D projection mapping examples match those definitions by the philosopher.

The initial reason for producing a digital large-screen projection in a public space, the type of presentation, and its content, they all influence the overall reception through their interaction.

The notion that the medialized public space consists of virtual elements, which can no longer be distinguished from the physical ones, may lead to insecurities in a society and the emergence of subtle fears. This process is particularly worrying if the presented content is used for propaganda.

A young scene, also active in the event sector for presenting music-, stage-, fashion-shows, and theatre productions, has little fear of the contact with commercially commissioned work outside of the arts. In this context, accepting profitable engagements can also finance artistic projects, some of them being very elaborate, for which, unfortunately, the public funding agencies often have little or no resources. As a result, light and media festivals often function as the interface between art and commerce.

According to the art historian Liz Kotz, dealing with mass media “also leads to a questioning of cultural identities that cannot simply be reduced to spectacle or surveillance, but it can also not be completely separated from them either” (Kotz, 2004, p. 58)<sup>5</sup>.

The transitions between art and commerce, between built reality and virtual augmented reality in public space, are fluid, and yet it is worth differentiating based on the content conveyed. Dazzling light and media art projects in public spaces could, therefore, sometimes raise awareness for a topic in the audience and invite them to be critical, reflective, and playful in their interactions.

The Polish artist Krzysztof Wodiczko, who lives and works in New York and Cambridge, Massachusetts, has been known since the 1980s for his large-format slide and video projections on representative buildings and monuments. The artist combines the aesthetics of the respective architectural language with the aesthetics of his projections and thus occupies the public environment for his political and socio-cultural activities. On three evenings in 1988, the artist projected an image onto the façade of the Hirshhorn Museum in Washington, DC, showing two hands, one with a pistol and one with a candle, and between them a row of microphones. The image was the artist’s response to the conflicting election promises made by George H.W. Bush at that time. In another 1999 project called *Hiroshima projections*, a video projected the hands of survivors and their descendants onto one of the few ruins that was not destroyed by the atomic bomb. The hands were reflected in the water of the river below, in which many people drowned after the bombing. For the cultural historian Giuliana Bruno, Wodiczko’s use of projection technologies and new media on architectural façades is of relevance precisely because it turns the architectural wall into a medium for social issues. “[...] Wodiczko has incessantly used the medium of projection to interrogate the face or façade of architecture as a dense surface: a permeable site for the mediation of memory, history, and subjectivity” (Bruno, 2014, p. 76).

4 “Das Spektakel in der Gesellschaft entspricht einer konkreten Herstellung der Entfremdung. Die wirtschaftliche Expansion ist hauptsächlich die Expansion dieser bestimmten industriellen Produktion. [...] Der von seinem Produkt getrennte Mensch produziert immer machtvoller alle Einzelheiten seiner Welt und findet sich dadurch immer mehr von seiner Welt getrennt” (Debord, 2013, p. 27).

5 „[...] auch zu einer Infragestellung kultureller Identitäten, die sich nicht einfach auf Spektakel oder Überwachung reduzieren lassen, aber auch nicht vollständig davon getrennt werden können.” (Kotz, 2004, p. 58)

## 5. Spatial augmented reality

The term spatial augmented reality was mainly used in the USA around the turn of the millennium for projects that predominantly included projection mapping. It describes the expansion of the concept of reality that includes a spatial component. In contrast to the use of AR-apps and displays, this projection technology allows a larger group of people to perceive virtual images and sounds in a physical environment simultaneously.

In a scientific context, the term spatially augmented reality (Raskar et al., 1998) appears for the first time in the research report published in 1998 by Ramesh Raskar, Greg Welch, and Henry Fuchs from the University of North Carolina at Chapel Hill. The scientists developed a new projection technology especially for a daily office life with which virtual objects can be projected directly into the physical world of the user. Shortly afterwards, the researchers presented the application under the name *shader lamps*. With the help of a 3D program and one or more projectors, it was now possible to relate the placement of a virtual object to the position of the projector and a real surface with perspective-adjusted images.

What is relevant for this process is the co-existence of built architecture and virtual content, which can then trigger both: emotions and critical discourse.

### 5.1 Playful ways of questioning the human scale

Since his *Body Movies (Relational Architecture 6)* series Lozano-Hemmer has been aiming (Fig. 5) at the direct relationship between humans and urban space.



Fig. 5 Rafael Lozano-Hemmer, *Body Movies, Relational Architecture 6*, 2001. Hong Kong, China, 2006.  
Photo by: Antimodular Research. CC BY-SA 3.0.

Powerful light projectors are used to transform large house façades into canvases on which shadow images of passers-by of all sizes can either interact with one another or stand on their own. The illuminated front outshines the simultaneously projected still images containing groups of people that then only become visible in the shadows of other images. When their outlines are superimposed exactly like a shadow shape, the motif changes. A drawing by Samuel van Hoogstraten from 1675 called *The Shadow Dance* inspired this work. Lozano-Hemmer distinguishes the terms virtual architecture and relational architecture by the fact that the former adapts the environment to a human scale, while relational architecture enlarges the human presence and brings it to the scale of the surrounding architecture (Lozano-Hemmer, 2021).

I like to use the term “relationship-specific” to describe the uniqueness of a discreet interaction between participants, different planes of experience, and the relational building(s). What is specific is the new behaviors that might emerge during interaction (Lovink, 2002, p. 307).

The interactive project *Dancing House* by the Austrian media artist Klaus Obermaier was also conceived as a series and can therefore be performed at different locations. The projection consists of several chapters with varying parameters for picture and sound, which are slightly modified from space to space. Without any interaction with the viewers, a building or just an element of a building is illuminated in white. An infrared camera records a person moving in front of the projector, which then appears as an enlarged outline in the projection on the façade using the Max/MSP programming language in real-time. The movements can cause explosive distortions up to and including the dissolution of the façade image into individual pixels (Fig. 6).

If only the central part of the building is illuminated, the image, depending on the movement patterns, can expand onto its sides, which then creates the illusion of pixels floating in the space. Each movement also triggers corresponding sounds that intensify the immersive experience. In other images, the white light changes into a raster of pixels, into white rectangles and grids, which react in different ways when corresponding with the audience. Such interactive projection mapping does not contain any provided narration but allows

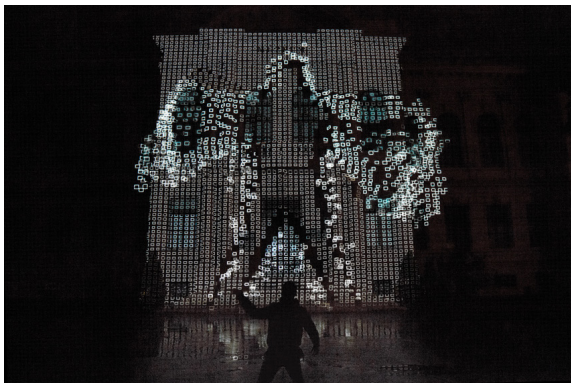


Fig. 6 Klaus Obermaier, *Dancing House*, interactive projection mapping and sound installation on October 4, 2014, as part of White Night, Kosice, Museum of Eastern Slovakia. Photo © Klaus Obermaier, Courtesy of the artist, [http://www.exile.at/dancing\\_house/](http://www.exile.at/dancing_house/)

viewers to communicate live with the virtual environment, making them active participants and an integral part of the performance (Obermaier, 2021).

## 5.2 Generative Art

Projection mapping is a presentation technique that combines descriptive geometry with projection technology and has its roots in the rediscovery of perspective in the Renaissance. The trompe-l'oeil and illusionistic ceiling paintings, popular in the Baroque era, are similar visual techniques that typically simulate a three-dimensional space on ceiling and wall frescoes.

A similar spatial effect can be found in the *l'écriture de l'espace* project from 2016 by the German artist label joeressen + kessner (Fig. 7), being part of the international light art festival INTERFERENCE, even though its crucial difference is the non-hierarchic approach and specific technique the artists are using. Eva-Maria Joeressen and Klaus Kessner modulated the illusion of a sphere floating in space in their trans-media real-time installation in the former Ottoman casern in the Medina of Tunis. The projected virtual sphere consisting



Fig. 7 joeressen + kessner, *l'écriture de l'espace*. 2016, *Kishlet el-Morjeni*, Tunis, site-specific transmedial real-time installation, room view, © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de).

of rotating lines, building rings and grids and a transparent membrane, which they had modelled from Tunisian tiles' patterns, seemed to float in the physical environment (joeressen+kessner, 2021). Depending on one's position in space, the appearance of a three-dimensional object would turn out to be a two-dimensional projection surface (Fig. 8).

In contrast to any kind of virtual space using illusionistic techniques, this art piece is not demanding to find the specific point of view which allows perceiving the total immersion of a virtual world. Instead, *l'écriture de l'espace* enables us to see both the physical reality and a kind of virtual reality at the same time and therefore be described as non-hierarchical. The sound level, generated in real-time, also enabled an auditory spatial experience within this complex system of interpenetrating physical and virtual expanse. Whereas typical projection mapping combines visual with acoustic layers, usually generated by a visual artist and a composer, image and sound in the artwork of the collective joeressen + kessner are generated by the computer in real time. The artists determine specific algorithms and layers for image and sound with basic objects or like the artists prefer to call them *basic organisms*. For example, for *l'écriture de l'espace* these

objects are two-dimensional lines, which behave like rings of a three-dimensional sphere. Parameters for the designing process and the transitions are precisely planned, the generative system is working in an autarkic but not autonomous way. The projection itself is not positioned centered, but with a slightly oblique angle, which reinforces the perception of spatiality. Every performance is not only site-specific but also temporally unique. joeressen + kessner work with the open-source software SuperCollider which is known for creating electro-acoustic compositions.

Their own description of the installation *Monte Sant' Angelo* from 2015 in Hildesheim at the light art festival LICHTUNGEN explains the relationships between image, sound, and time (Fig. 9). Inspired by the Romanesque architecture of the Sankt Michaelis church the artists evolved a concept based on the analysis of the geometry of the location. As a result, they chose the square as basic element. Decisive aspects of the installation are largely determined by the square: The optical components are white squares, the digital image signals are based on the square proportion, the development of the projections result in square dimensions. The overall work includes one outdoor projection and two indoor projections

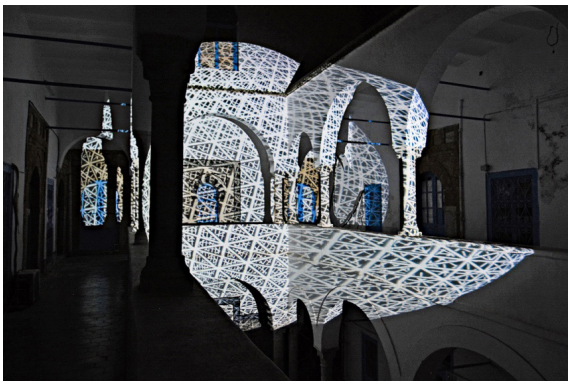


Fig. 8 joeressen + kessner, *l'écriture de l'espace*. 2016, Kishlet el-Morjeni, Tunis, site-specific transmedial real-time installation, room view, © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de).



Fig. 9 joeressen + kessner, *Monte Sant' Angelo*. 2015, St. Michaelis Hildesheim, site-specific transmedial real-time installation © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de).



Fig. 10 joeressen + kessner, Monte Sant' Angelo. 2015, St. Michaelis Hildesheim, site-specific transmedial real-time installation, room view  
© joeressen + Kessner, with the kind permission of the artists,  
[www.joeressenkessner.de](http://www.joeressenkessner.de).

as well as a spatial sound-system. The diagonal off-center position and angle of the two projectors inside the church are responsible for the specific spatiality the projection art (Fig. 10).

Image and sound are generated in the same computing process and mutually linked to each other. They are located at the same spot where they appear. When the image moves horizontal so does the sound. Vertical moving images change the pitch on the acoustic level. The size of the objects also has an impact on the pitch and speed. For example, large objects are accompanied by a dark deep tone and move slowly. In this way, a picture-sound relation with abstract forms based on spatial and temporal parameters is generated, which is written into the specific space.<sup>6</sup>

### 5.3 History in public discourse

The US-American media artist Rose Bond leaves the cinema screen with her drawn animations and instead stages her films in the windows of existing buildings. In contrast to

the projections on façades, the rear projections from the inside of a house refer directly to the existing rooms inside the building. In western society in particular, the ones shaped by Christianity, a window is not only used to let a lot of light into the room but also to maintain a view of the exterior, so that one can indirectly participate in the life outside without being seen. In many cultures, a view of the inside of a house or an apartment is usually denied, and all private life is hidden from the public. At the same time, a window that is illuminated bright at night has a special charm and attracts the attention of passers-by.

Rear projection in windows evokes a feeling of emanation that differs from front projection imprinted on a building façade. Seen from the street, animated markings can betray a presence. As the light in the window, they cohabit intimate space. My recent works may evoke history or explore a theme associated with the site as the animation converges with the architecture. My content, researched yet fragmentary, is framed by window casements and hidden by walls. Scrolling text, names, dates, statistics, shadowy silhouettes, and hints at gesture combine in glimpses profoundly tied to inhabited place. Impossible to absorb in a traditional single screen; multiple windows call for an active viewing (Bond, 2017).

Rose Bond's animated films contain memories and stories that deal with historical aspects of a city, as in the example of *CCBA*. *CCBA* is the abbreviation for Chinese Consolidated Benevolent Association, an organization founded by Chinese migrants in the USA in 1882 and that campaigns heavily for this population group. In her animated film, Rose Bond visualizes the traditional everyday life of Chinese migrants and their descendants in the USA; in particular, she shows children learning the Chinese language and writing in specially designed language schools (Fig. 11).

<sup>6</sup> E-mail conversation between the author and joeressen + kessner





Fig. 11 *Rose Bond, CCBA*, with the kind permission of the artist, © Rose Bond 2016.

Leon Battista Alberti's window metaphor comes to mind when considering art history. According to this, Alberti speaks not only of looking at a picture in a window, but of observing people who move and act outside the window. So, the window is not only associated with a picture frame and the perspective view of a canvas, which would correspond to the glass of the window, but it also compares the life outside the window with a theatre performance. Rose Bond reverses this relationship between inside and outside by including the window but also the inside of the façade in her multi-channel projection, to develop, in the spirit of Alberti, an *historia*, "a stage-like performance of a material"<sup>7</sup> (Belting, 2008, p. 265). Viewers stand on the street and look up to the windows, which then do not appear flat but allow a glimpse into Rose Bond's virtual worlds.

*Monumento remix FSLP 18* by the Brazilian collective Visualfarm was implemented as part of the São Paulo Light Festival 2018. With this project, the collective succeeded in temporarily redesigning the 43-meter-long and controversial *Bandeira's* monument from the 1950s. The monument shows Portuguese bandeirantes who penetrated inland Brazil in search of gold and diamonds in the 17th century and enslaved indigenous people there. The actual physical sculpture shows a white man

on his horse and a group of slaves pulling a boat. Visualfarm projected an animated film onto this sculpture and onto a projection screen behind the object, which dealt with the critical examination of history and with the monument itself.

The film ends with the statement that all Brazilians are the same and are sitting together in the same boat. Visualfarm used seven projectors for this project. With the additional use of LED lights, which temporarily dazzled the viewer, an optical illusion was possible, the purpose of which was to seemingly set the sculpture in motion. Due to the basic brightness at this location, it was only possible to block visual perception for brief moments via the glare, to create a virtual darkness and, as a result, to make the projection appear brighter. For the planning of the *Monumento remix FSLP 18* project, based on drone images of the *Bandeira's* monument, a separate 3D model was created and printed (MAB, 2021).

#### 5.4 *Living in the Anthropocene*

In 2008, Robert Seidel designed a façade projection with the name *Phyletic museum | Processes: Living Paintings*, on the occasion of the celebrations for the 100th birthday of the

<sup>7</sup> „[...] eine bühnenhafte Aufführung eines Stoffes.“ Belting 2008, p. 265

Phyletic Museum in Jena (Fig. 12). Robert Seidel is a German artist whose interest in biological processes as well as analogue and digital media permeates his diverse oeuvre of animation films, installations, performances, façade projections and films for media façades.

His expansion of the real space via experimental interpretations of biological processes shows a different way of site-specific work than the previously described project by Pablo Valbuena since the work relates less to the architecture of the building than to the contents of the museum. Nevertheless, Robert Seidel also stages the façade of the Art Nouveau building. The video projection in Jena is divided into five 'living paintings', which refer to the contents of the Evolutionary Biology Museum. Natural processes such as the wave distribution in the water or radiolarians, small radiant animals, served as templates for the artistic interpretation of Seidel (Fig. 13).

In cooperation with the media artist Florian Licht, the five-minute video projection, which was adapted to the façade using projection mapping, was combined with a light staging of the interior, supplemented by a 17-minute soundtrack by Robag Wruhme. This resulted in alternating combinations of image and sound and different possibilities of perception. The

façade architecture became the canvas for 'tableaux vivants' that emerged from the context of the museum.

Already in 2006 Polish artist Karolina Sobecka created *Wildlife*, an interactive installation of an animated tiger, projected from a moving car on urban surfaces. Karolina Sobecka is an artist, designer and researcher examining social arrangements that exploit, resist, or accommodate technological change.

For her artwork *Wildlife* she was inspired by Bill Brands *Masstransiscope* from 1980, mural paintings in a subway tunnel in Brooklyn, which are animated by passing trains. In *Wildlife* the movements of the projected tiger correspond with the speed of the car.

The projecting itself appears and disappears depending on the surroundings. The moving tiger on the built environment is a metaphor for the handling of nature in human culture, especially the elimination of the animal world in urban environments. The artist claims that nowadays there are more tigers privately owned, than in the wild.

Furthermore, the artist was surprised about the way of how people were paying attention to the emerging of the tiger in



Fig. 12 Robert Seidel, PHYLETIC MUSEUM | PROCESSES: LIVING PAINTINGS, Jena 2008. Courtesy of the artist, © Robert Seidel.



Fig. 13 Robert Seidel, PROCESSES: LIVING PAINTINGS, Phyletisches Museum Jena, 2008. Courtesy of the artist, © Robert Seidel.

environments. In city centers people seemed to be so used to the augmented surrounding mostly by advertising that they do not react on the passing by tiger so much. In areas with no advertising the artist noticed that especially homeless people watched her projections more carefully (Hardstaff, J. & Wells, P., 2008, pp. 174-177).

Another woman artist is the German stage designer and visual artist Rosalie (Gudrun Müller, 1953-2017) discussing central problems in the Anthropocene age, such as the species extinction of the animal kingdom.

*Marathon der Tiere* (marathon of the animals) was an audio-visual installation at the lichtsicht -Projection Biennial in Bad Rothenfelde, Germany curated by Peter Weibel in 2015.

The venue for this protection biennial is rather interesting. The screen has a unique materiality, the graduation works consist of blackthorn branches, limescale, ferrous encrustations and salt deposits.

Therefore, the surface of this 312 meters long and 10 meters high wall is uneven and structured.



Fig. 14 Kelley Bell, Corrie Francis Parks, *Projected Aquaculture* 2016, Baltimore. Courtesy of the artist, © Corrie Francis Parks.

For the video projection, the artist was using real images, animations, and scientific/technical data material of different animals. The images originate from a high-speed x-ray video facility, in which the motion sequences of animals have been investigated. The video was presented in a 6-channel-projection, the duration is 25 min.

Hence *Marathon der Tiere* also addresses existing and future kinetic systems, such as those typical for robotics, bionics and mechatronics and that are based on movement matrices: fixed points, variables, space curves, line geometry, vector representations and parameter representations of cooperation between animal and technology combine, grow and coalesce into their own artistic notations (Weibel, 2015, p.91).

This artwork is referring to Eadweard Muybridge and his sequence photography of galloping horses. But Rosalie is escalating the desire of mankind to explore animals in motion using mixed media. "Thanks to digital processing, the moving image, video and animal movements are elevated to a new visual abstraction, in which op art and kinetic art converge to projection." (Hartmann & Weibel, 2015, p. 11) .

In spring 2016, Corrie Francis Parks and Kelley Bell participated at the Light City Baltimore Festival in Baltimore, Maryland with their large-scale projection *Projected Aquaculture* (Fig. 14).

The projected animation draws parallels between the fragile ecosystem and recent regeneration of the Chesapeake Bay and the city Baltimore. The artists compare the eco-system of the bay with the diversity und plurality of Baltimore City. They both support a diverse population of inhabitants, and both suffered a long period of neglect and deterioration in the mid and late 20th century. Since the beginning of the 21st century, the bay is undergoing a period of recovery, which has also a positive influence on the city. The artists created an online limerick field guide and an online interactive bingo game *Bay Bingo*. The field guide includes information about the Chesapeake



Bay and the 3.600 species of animals, plants and fish living there. Kelley Bell and Corrie Francis Parks did a new version of *Projected Aquaculture* for the MOCA Lights festival in fall 2020 in Patchogue, USA. They also have received a grant from their university to adapt this artwork into an interactive platform and bingo game for educators.

### 5.5. Social participation

As part of the "Carinho de Verdade" (affection of truth) campaign in 2010, which lobbied to raise awareness for the issue of sexual abuse of children and adolescents, the Brazilian artist collective Visualfarm was commissioned to project onto the Christ statue in Rio de Janeiro. At the end of the displayed film, designed by Fernando Salis, an animated butterfly, the campaign's symbol, appeared as if the monument became alive. The statue seemingly drew its arms to its chest in a big gesture of a hug. In 2017 Visualfarm received the MAB Prize (Media Architecture Biennale Award) in the category "Participatory architecture & urban interaction" for its *Chave Do Centro* (The Key to Downtown) project in São Paulo (MAB, 2021). Alexis Anastasiou from Visualfarm, himself a resident and artist in São Paulo, invited the artists Felipe Morozini, Roberta Carvalho, Leandro Menges Vigas, VJ Alexis to a 30-day long media art festival, to create animated and experimental films for four façades along the four-lane city motorway, which connects the eastern with the western parts of São Paulo. This elevated road, built during the military dictatorship in the 1960s, represents serious acoustic and environmental pollution for the residents. More than 35 years after its construction, the local community succeeded in proposing partial driving bans that converted the road into a temporary pedestrian zone. The festival was a particularly great success, mainly because the new possibilities for city walks had been enriched with art in public spaces. There were also several participatory projects, like workshops for children who, with professional support, could also create animated films for projection on the façades. The long running period

of 30 nights could be achieved by keeping the costs for the projections and the very targeted PR work low, as media servers and laser-projectors could be situated and looked after in private apartments.

This project brought many new visitors to the streets, increased interest in art in public spaces and significantly improved the feeling of security in the area that had previously been classified as particularly unsafe. Due to this effect, the city government extended the time window for the temporary pedestrian zone after the festival for all nights from 8 pm to 7 am.

## 6. Conclusion

Animation is not only used for visualization but also in the architectural design process itself, it is furthermore the main content in projection art on urban surfaces seen in art projects but also used for commercial purposes.

Guy Debord's description of a society of spectacle, formulated in the 1960s, also applies to today's consumerist society. Everything around us, in public and in private areas, is shaped by a new aesthetic, influenced by the omnipresent advertising industry. It is not just about the presentation of economic goods anymore, but about the commercialized design of all areas of life, which does not stop at arts. It is becoming increasingly difficult to draw boundaries between everyday life, art, design, and the spectacle in public and private spaces. However, animated urban spaces can trigger processes of sensitization, as described in the examples. The real and virtual spaces mutually create an environment that affect the audience directly and actively involve them. Such animated surfaces expand the space in a site-specific or conceptual way. As long as the reference to the real physical environment remains and if this is in a dialogue with the virtual content, the necessary distance to the work of art for enabling reflection can be established, even if the spaces are immersive.

Viewers can either participate and find a position to discover an illusionistic, virtual image in its spatial effect as discussed in the chapter about generative projection art by joeressen+kessner. Or as argued in *Monumento remix FSLP 18* by the Brazilian collective Visualfarm recipients are invited to participate in a more figurative sense, they can form an opinion about the content and get to know new perspectives and contexts. At the municipal level, projects such as *Chave do Centro* can also trigger a rethinking process in politics and change public life in the long term.

The animated installations by Rose Bond using windows of buildings as screens invite citizens to deal with the history of the neighborhood and at the same time giving them the possibility to reflect on changing the point of view from private to public, from inside to outside and vice versa.

Since 2000 one of the key topics has been the extinction of species caused by humans in the Anthropocene age. Artists use different animation techniques to point out this problem and to visualize biodiversity like *Wildlife* by Karolina Sobecka *Phyletic museum | Processes: Living Paintings, Marathon der Tiere* by rosalie, *Projected Aquaculture* by Corrie Francis Parks and Kelley Bell.

## References

Bartlett, M. (2010). Guest editorial: Stan VanDerBeek Re:animated. *Animation: An Interdisciplinary Journal*, 5(2), pp. 116–119. <https://doi:10.1177/17468477100050020901>

Belting, H. (2008). *Florenz und Bagdad. Eine westöstliche Geschichte des Blicks*. C.H. Beck.

Bond, R. (2017). Poetics and Public Projection: Layered History, Redrawn Memory. In *Animation Studies – Peer-Reviewed Online Journal for Animation History and Theory* 12 - ISSN 1930-1928 [URL: [HTTP://journal.animationstudies.org/](http://journal.animationstudies.org/)

[category/volume-12/rose-bond-poetics-and-public-projection-layered-history-redrawn-memory/](https://doi.org/10.1177/17468477100050020901)

Bruno, G. (2014). *Surface. Matters of aesthetics, materiality and media*. The University of Chicago Press.

Debord, G. (2013). *Die Gesellschaft des Spektakels* (2nd ed.). Bittermann.

Fraser, A. & Wilcox, K.J. (1979). Perception of illusory movement. *Nature*, 281, 565-566. <https://doi.org/10.1038/281565a0>

Grau, O. (2003). *Virtual Art. From Illusion to Immersion*. The MIT Press.

Hartmann, I. & Weibel, P. (2015). From shadow image to selfie: updating projection art. In lichtsicht ggmbh (Ed.). *lichtsicht* 5. Kehrer, (pp. 4-17).

Kotz, L. (2004). Die Disziplinierung des Expanded Cinema. In Museum Moderner Kunst Stiftung Ludwig Wien & M. Michalka. (Eds.). *X-Screen, Filmische Installationen und Aktionen der Sechziger- und Siebzigerjahre*. Verlag der Buchhandlung Walter König, pp. 46 -73.

Lombardo, V. et al. (2009). A virtual reconstruction of Poème Électronique based on philological research. *Computer Music Journal*, 33(2), pp. 24-47. <https://doi.org/10.1162/comj.2009.33.2.24>

Lootsma, B. (2013). Mehrfachbelichtung. Von Architektur, künstlichem Licht und den Medien. In M.Kries, & J. Kugler (Eds.). *Lightopia*. Vitra Design Museum, pp. 65 - 82.

Lovink, G. (2002). Real and Virtual Light of Relational Architecture - an interview with Rafael Lozano-Hemmer. In G. Lovink (Ed.). *Uncanny Networks - Dialogues with the Virtual Intelligentsia* The MIT Press, pp. 304-313.

Lukes, R.D. (1996). *The Poème électronique of Edgard Varèse*, Ph.D. diss., Harvard University.

Lynn, G. (1999). *Animate Form*. Princeton Architectural Press.

Maniello, D. (2015). *Augmented reality in public spaces. Basic techniques for video mapping*. Le Penseur.

Manovich, L. (2006) The poetics of urban media façades. *First Monday*. <https://doi.org/10.5210/fm.v0i0.1545>

Mondloch, K. (2004). A Symphony of Sensations in the Spectator: Le Corbusier's Poème électronique and the Historicization of New Media Arts. *LEONARDO*, 37(1), pp. 57-61. <https://doi.org/10.1162/002409404772828148>

Museum Moderner Kunst Stiftung Ludwig Wien & Michalka, M. (Eds.) (2004). *X-Screen, Filmische Installationen und Aktionen der Sechziger- und Siebzigerjahre*. Verlag der Buchhandlung Walter König.

Pop, S., et al. (Eds.) (2012). *Urban Media Cultures*. avedition.

Raskar, R., Welch, G. & Fuchs, H. (1998). Spatially Augmented Reality. [https://www.cs.unc.edu/~welch/media/pdf/IWAR\\_SAR.pdf](https://www.cs.unc.edu/~welch/media/pdf/IWAR_SAR.pdf)

Torre, D. (2015). The Metamorphosis of Place: Projection – Mapped Animation. In Ch. Pallant (Ed.), *Animated Landscapes, History, Form and Function*. Bloomsbury, pp. 199-214.

Weibel, P. (2015). rosalie. Marathon der Tiere. In lichtsicht ggmbh (Ed.): *lichtsicht 5*. Kehrer, pp. 84-99.

Wells, P. & Hardstaff, J. (Eds) (2008). *Re-Imagining Animation. The changing face of the moving image*. AVA.

## Websites:

joeressen + kessner: *l'écriture de l'espace* <https://www.joeressenkessner.de/joeressenpluskessner/articles/inp.html>

Lozano-Hemmer, Rafael: *Body Movies (Relational Architecture 6)* [https://www.lozano-hemmer.com/body\\_movies.php](https://www.lozano-hemmer.com/body_movies.php)

MAB (Media Architecture Biennial): *Chave do Centro* <https://awards.mediaarchitecture.org/mab/project/69>

MAB (Media Architecture Biennial): *Monument Remix* <https://awards.mediaarchitecture.org/mab/project/41>

Obermaier, Klaus: *Dancing House* [https://http://www.exile.at/dancing\\_house](https://http://www.exile.at/dancing_house)

Valbuena, Pablo: *Para-polis* <http://www.pablovalbuena.com/para-polis>

Today'sArt festival 2008: Co-production: Pablo Valbuena - N 520437 E 041900 [the hague city hall] <https://today'sart.org/project/pablo-valbuena-augmented-space>

## Illustrations:

Fig. 1: The Philips pavilion at the Brussels World's Fair 1958, Photo © Wouter Hagens – Own work, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

Fig. 2: Pablo Valbuena, *Para-Polis [The Hague]*, site-specific installation. Photo © Pablo Valbuena, courtesy of the artist, [www.pablovalbuena.com](http://www.pablovalbuena.com)

Fig. 3: Pablo Valbuena, *Para-Polis [The Hague]*, site-specific installation. Photo © Pablo Valbuena, courtesy of the artist, [www.pablovalbuena.com](http://www.pablovalbuena.com)

Fig. 4: Pablo Valbuena, *Quadratura*. 2010, Abierto x obras, Matadero Madrid, site-specific installation. photo © Pablo Valbuena, courtesy of the artist, [www.pablovalbuena.com](http://www.pablovalbuena.com)

Fig. 5: Rafael Lozano-Hemmer, *Body Movies*, Relational Architecture 6, 2001. shown here: Hong Kong, China, 2006. Photo by: Antimodular Research. CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0, Spain License>.

Fig. 6: Klaus Obermaier, *Dancing House*, interactive projection mapping and sound installation on October 4, 2014, as part of White Night, Kosice, Museum of Eastern Slovakia. photo © Klaus Obermaier, Curtesy of the artist, [http://www.exile.at/dancing\\_house/](http://www.exile.at/dancing_house/)

Fig. 7: joeressen + kessner, *l'écriture de l'espace*. 2016, Kishlet el-Morjeni, Tunis, site-specific transmedial real-time installation, room view, © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de)

Fig. 8: joeressen + kessner, *l'écriture de l'espace*. 2016, Kishlet el-Morjeni, Tunis, site-specific transmedial real-time installation, room view, © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de)

Fig. 9: joeressen + kessner, *Monte Sant' Angelo*. 2015, St. Michaelis Hildesheim, site-specific transmedial real-time installation © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de)

Fig. 10: joeressen + kessner, *Monte Sant' Angelo*. 2015, St. Michaelis Hildesheim, site-specific transmedial real-time installation, room view © joeressen + Kessner, with the kind permission of the artists, [www.joeressenkessner.de](http://www.joeressenkessner.de)

Fig. 11: Rose Bond, *CCBA*, with the kind permission of the artist, © Rose Bond 2016

Fig. 12: Robert Seidel, *PHYLETIC MUSEUM | PROCESSES: LIVING PAINTINGS*, Jena 2008 Curtesy of the artist, © Robert Seidel

Fig. 13: Robert Seidel, *PROCESSES: LIVING PAINTINGS*, Phyletisches Museum Jena, 2008 Curtesy of the artist, © Robert Seidel

Fig. 14: Kelley Bell, Corrie Francis Parks, *Projected Aquaculture* 2016, Baltimore, Curtesy of the artist, © Corrie Francis Parks