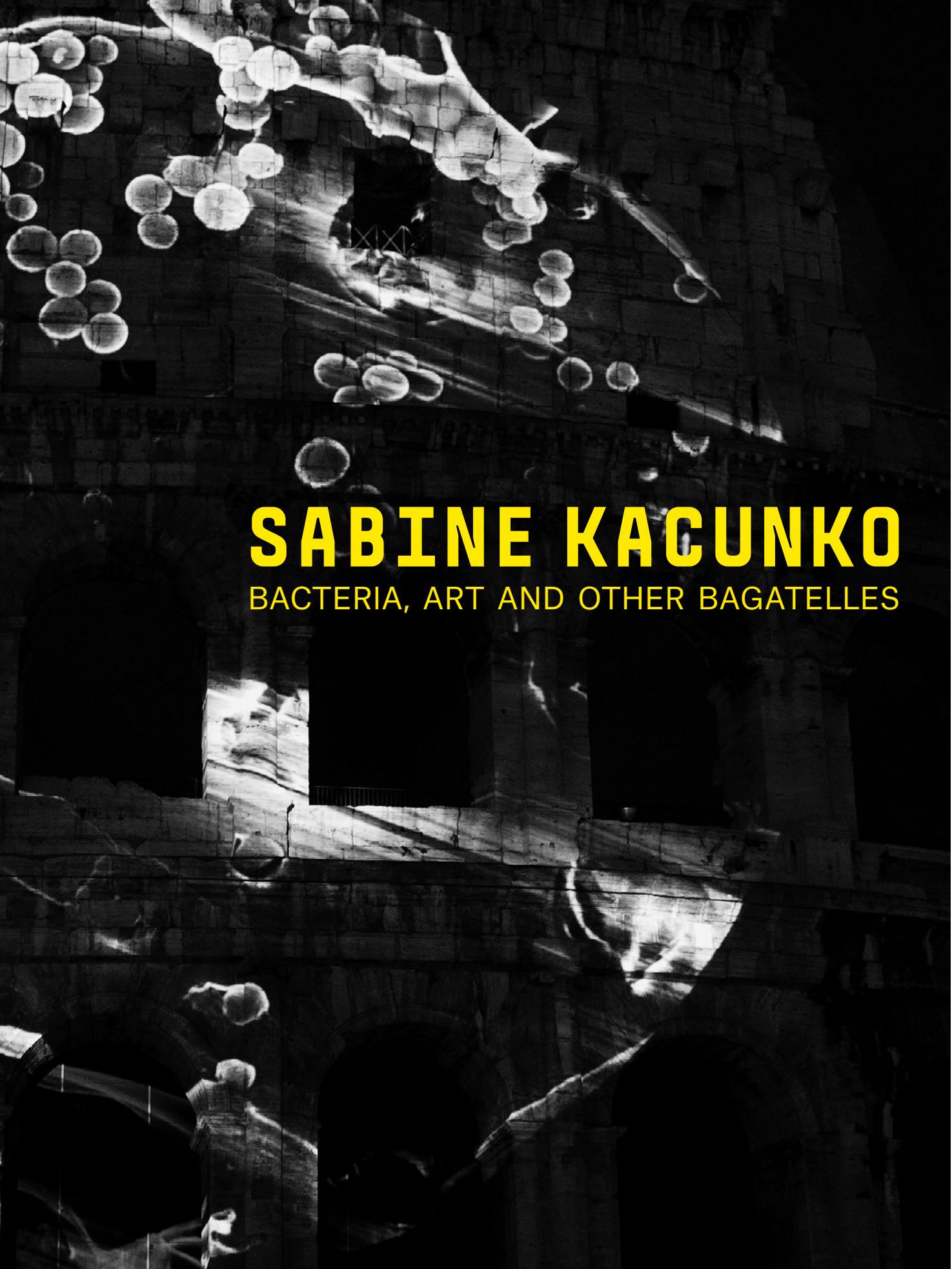
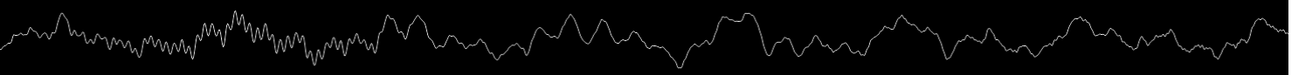


SABINE KACUNKO

BACTERIA, ART AND OTHER BAGATELLES



SABINE KACUNKO

Bacteria, Art and other Bagatelles

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SABINE KACUNKO. BACTERIA, ART AND OTHER BAGATELLES

CATALOGUE OF WORKS

This introductory essay merges remarks written over the past years on the work of Sabine Kacunko. Without claiming completeness, it follows the major tracks of her artistic development which commenced with analogue b/w-photography, slide photography and photographic installations and led to interactive light and closed circuit video installations, media performances and permanent installations. The range of the presented works also covers audio and networked sculpture and choreography as well as performances and projections in public spaces, conceived for and accomplished in collaboration with major cultural heritage sites and scientific institutions, media partners and diplomatic offices. While Sections 1 and 2 have not been previously published, Section 3 has been published in part in the final chapter of my recent essay-collection *Culture as Capital* (2015). Section 4 is an extended version of a lecture held at the conference *Bacteria, Art and other Commodities* (Medical Museion in Copenhagen) on May 15th 2015, while Section 5 combines and extends remarks on 'Life' from the chapter of *Cultural Capital* mentioned above, with those presented in the inaugural lecture *Choose_Life: Cultural Techniques, Technocultures, and Reflectiveness* (IKK, University of Copenhagen) on April 26th 2012.

Slavko Kacunko

Section I
Sabine Kacunko: Becoming Invincible

Wherever Rome's influence extends, over the lands it has civilized, I will be spoken, on people's lips: and, famous through all the ages, if there is truth in poets' prophecies, – vivam – I shall live.

Publius Ovidius Naso, *The Metamorphoses*, Bk XV:871–879 Ovid's Envoi

Who broke up and removed, bit by bit, that mountain of masonry? Who overthrew the giant? Was it age, the elements, the hand of barbarians, or some other irresistible force the action of which has escaped observation?

Lanciani, R (1901), *The Destruction of ancient Rome. A Sketch of the History of the Monuments*. The Macmillan Company, New York, p. 3.

While it is true that everything visible is becoming, it is not true that all becoming is visible.

Grant, I H (2006), *Philosophies of Nature After Schelling*. Continuum London, p. 44.

LIGHT AND LIFE

High Light, *Origin of Light*, *Vision*, *Looping Life*, *Transmission of Life*, *Life Flag*, *P.O.L.* (*Process of Life*) – a cursory glimpse on the titles of her recent projects reveal clearly the central position of 'light' and 'life' in Sabine Kacunko's art. Seen from this perspective, it is no surprise that her current project *Invincible* is being granted UNESCO-patronage in the context of the International Year of Light and Light-Based Technologies 2015. The underlying purpose of *Invincible* is to address concepts of sustainability, ecological structures and social models in calling attention to one of the most iconic World Cultural and Natural Heritage sites – the *Amphitheatrum Novum*, usually known as the Colosseum in Rome. For cultural travellers, the Colosseum has always been a highlight and final destination of the Grand Tour. The artist has decided to dedicate this project as the starting point for her own global 'Grand Tour' related to the co-initiated international *Big Bacteria*-network that is supposed to pool a wide range of disciplines to address the proverbial diversity, variety, ubiquity and other well-known superlatives of bacteria. (cf. Section 4) The intention which Sabine Kacunko pursues here, as in several previous projects (cf. Section 3), is to 're-convey', or 're-mediate' the visibility of chosen objects of special interest and initiate their 'healing' process. The largest amphitheatre in the world thus becomes by artistic purpose a model with strategic potential to boost and engender interdisciplinary cooperation – art history, archaeology, cultural and natural studies are only the most obvious disci-

plines to come to mind. The Colosseum is supposed to be illuminated with a huge live projection of its smallest inhabitants – bacteria – taken from and projected onto its outer surface.

Invincible is not necessarily designed to provide a huge projection screen for power and 'opium' for the public, as so often has been the case in Colosseum's history. The core purpose of the project is to offer an interdisciplinary discussion platform that connects art, science, humanities in the widest possible public domain. The intention which Sabine Kacunko followed in several previous projects was, as in this case, to direct attention to public sites with particular cultural, political and ecological backgrounds. In the age of diffuse globalization it becomes more and more important to illuminate individual surfaces and contents. The process begins with spotlighting of the selected and 'charged' places, circulating information around and about them, thus setting up a dialogue about their history, present and future anew. Its overarching purpose is to call attention to the World Cultural and Natural Heritage and to investigate concepts of sustainability, ecological and economic structures as well as social models. The most famous amphitheatre in the world and the symbol of the eternal city is therefore neither just used as a mere display for a political message nor is it exploited for any other purpose than to be highlighted itself as a model which may, or may not boost an envisioned interdisciplinary research. Perhaps the most obvious subject matter comes to mind when we think back about the surprisingly insignificant art historical research in tracing back the Rome-wide spoliation of Colosseum throughout centuries.[1] But there is much more than that. What I especially wish to focus on is the parallel between health and heritage which Sabine Kacunko draws again and again. In case of *Invincible*, it is a homage to Girolamo Fracastoro (1478 or 1483–1553), Italian physician and humanist and a pioneer in bacteriology, clinical epidemiology and modern pathology, to whom she dedicates her project. He opposed the humoral miasma theory of disease, which was common in those days. His intense study of epidemic diseases led to his *On Contagion and Contagious Diseases* (1546), the first scientific statement of the true nature of contagion, infection, disease germs, and modes of disease transmission. It stated that each disease is caused by a different type of rapidly multiplying minute body, transmitted by direct contact, by carriers such as soiled clothing or through the air. Girolamo Fracastoro anticipated the existence of microbes and is thus celebrated as pioneer of modern microbiological research. However, Sabine Kacunko's wish is not to confine art solely to its appellative function or celebratory occasions; her artistic aim is for collaboration between Sciences and Humanities to come more explicitly and concretely into play.

INVISIBLE METAMORPHOSIS

As the world-wide icon of cultural heritage, the Colosseum is supposed to be illuminated by a huge light-installation projecting live the bacterial biofilm (*patina*) on its most exposed north-west side. This recently restored area

Sabine Kacunko, Trial projection on the surface on the NW-façade of the Colosseum. 24th March 2015.

Sabine Kacunko, Trial projection on the surface on the NW-façade of the Colosseum. 24th March 2015.

Sabine Kacunko, Trial projection on the surface on the NW-façade of the Colosseum. 24th March 2015.

Arch of Constantine, seen from the 2nd floor of Colosseum. May 2015.

Arch of Constantine, east side with the medallion of *Sol Invictus*. February 2015.

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measuring about 1,400 m² carefully considers the lighting situations of the day and the season as well as the topography and traffic conditions. Together, they allow a full-time lighting of the chosen spot that can be seen from Via dei Fori Imperiali all the way to Piazza Venezia. Samples of patina – the natural organic film – have been removed from the surface of the building and placed under a microscope. The connected projectors transmit the images in real time, on the external surface of the object from which the patina has been removed. For a moment the 'secret' microcosm of the patina emerges from the darkness into the light. The metabolism of the micro-organisms produces substances of sediments – pigments – that create intense compositions of constantly changing and different lights and colours. In this way the patina in the dark appears as what it really is: a colourful world of pigments arising from the sediments of the micro-organisms. The simultaneous multimedia presentation of microcosm and macrocosm creates on the surfaces parallel worlds that usually remain hidden in daily life. The quintessence of *Invincible* is the celebration of life and its basic condition: transformation or metamorphosis. In this regard, *Invincible* takes one famous and one rather infamous work by the Roman poet Ovid as points of both departure and return: *Remedia Amoris* (*Love's Remedy or The Cure for Love),* and the *Metamorphosis*.

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The illumination happens not only on a conceptual and visual level (illumination of a public building through live video projections) but also on that material by integrating and visualising the micro-organisms that provide the essential artistic instrument with a model of communication and social forms that are intelligent and capable to survive. The micro-organisms protect the monument from destruction caused by harmful environmental influences and thus secure the transmission of our cultural memory (for this aspects cf. Section 4). Seen in this perspective, *Invincible* stands as an example of lasting global cooperation in the conservation of cultural assets and natural resources. It aims to shed light on the processes of democratization, the concepts of sustainability as well as the ecological and economic structures, investigating the complex relation between man and nature and presented to the local audience – and to world via Internet – through the both media and dance performance. Multimedia-performance, sound and dance include a projection on the façade of the Colosseum while the audio-visual data are transmitted both locally and online. The reaction of the daily differently 'stressed' micro-organisms (via different substances like adrenaline, cortisone et. al.) in the patina particle are analysed in real time and translated acoustically through appropriate software. The special quality of this synaesthetic concept is that the pictures and the sound not only react mutually but also are coupled initiating their own real soundscapes. The projection surface on the façade of the Colosseum becomes therewith a 'time window' in which macrocosm and microcosm enter. The visitor is able to perceive the

Sabine Kacunko in her Studio in Berlin. July 2015.

sound through the sound spots (portable wireless loudspeakers) positioned at various points.

The colossal live-images of bacteria from the corresponding Colosseum's surface are less visible while the path of the Sun faces the south side of the nearby Arch of Constantine. The visible bacteria-projection vanishes then for an instant (between 6 and 7 pm on September 17th 2015) due to the last sun rays, before reappearing in its full visual power just after the sunset. Due to the carefully considered content-related parameters, the virtual dialogue of the two major spots of the world heritage site plays a seminal role within the overall concept. Constantine's adoption of the cult of SOL INVICTVS or the 'invincible sun' early in his career is highlighted on the medallion on the eastern side showing the Sun rising symbolized by the Helios as chariot (and corresponding to the Moon on the western side). Together with Constantine's famous coin which bears the inscription SOLI INVICTO COMITI – 'To the Invincible Sun my companion' – and the famous inscription INSTINCTV DIVINITATIS on the Arch of Constantine itself, the invincible and invisible, the sensual and intelligible realms are addressed with a language and gestures of religious and cultural tolerance. At the same time, the both Victories covering the upper part of the central arch recall and prefigure both the Greek Nike and Christian Angels, thus cancelling the distinctions and providing a universal character to the complex which spans the Via Triumphalis between the Colosseum and the Palatine Hill.

The extensive usage of spolia on the Arch of Constantine is likewise a reference to the cultural and natural cycles addressed by the bacteria as irreplaceable media of the recycling matter. Bacteria deserve this position first of all due to their metabolic diversity, enabling them to obtain carbon atoms and energy from practically everywhere on Earth. This diversity-based feature, seen by many as the true nature of bacteria, makes them to the real synonym of ubiquity. Being the oldest, smallest, most abundant and structurally simplest organisms, bacteria are diverse and varied, as well as vital for all

other life forms. As living solar cells, bacteria are 'messengers' of life, regarded as 'inventors' of photosynthesis and therefore responsible for the transformation of sunlight into chemical energy. As such, bacteria must be treated not only as indispensable components, metaphors and models of knowledge, but increasingly as material, medium and methods for its acquiring as well. Sabine Kacunko's corresponding understanding and artistic usage of bacteria have been exemplified in a larger number of public, site-specific and museum installations throughout the past fifteen years, to which I shall return in Section 3 below. But first I need to address the gradual process which finally led to her bacteria art: Its very beginnings can be detected in the field of photography.

Section II
Reality of the Black & White

SELF: REFLECTED AND STAGED

Sabine Kacunko's photographic works from the 1990s appear "overwhelmingly unspectacular";[2] they were generally captured with natural light, "relying on the form's vehemence",[3] enormously enlarged and often composed according to a strict symmetry. The choice of medium and material have effected a transformation from subject to metaphor and then to the very model of artistic practice itself. The discovery takes place through the self: the artist puts her own body almost programmatically in the carefully arranged photographic composition of her first *Self-portrait* (1989). The body occurs as a disconcerting means of representing visualized thought processes[4]. Disconcerting because the photographic body image as epitome of 'evanescent life'– thus of death and the past – aims to call the image itself into question. It is not the image that serves to question the body's existence, but the body which serves to fundamentally question the 'possibility' of the image. The unmoving body is positioned on a four-step pedestal, an 'intermediate step' of the black circle inscribed in the optical centre of the white square. The circle features another white circle in its centre (a wide-brimmed hat visible only in silhouette), which, in turn, marks the exact geometrical centre of the white square. The length of the square's sides matches the width of the backs of the two chairs which extend to the ground, arranged in strict parallel. They are recognizable as three-dimensional forms only through the subtle 'light-drawing' of their inner joints and edges. Set between them at an elegant distance is a narrow, low four-step pedestal on which the artist herself stands, calmly and stiffly, with her back turned to the camera lens and her arms held close to her body. But her body's curves and the gray tones of her appearance barely challenge the rigorous black and white, the dedicated geometry and the graphics of the otherwise undifferentiated space. The body, the 'I' as an upside-down exclamation mark, is reduced to the sign that takes its 'firm' place between the interacting symbols of the step between the two chairs and the square of light, the symbol that turns towards the 'prospect' or 'withdrawal'. The appealing 'prospect' because or in spite of its complete emptiness, there is nothing but the light itself that can

sequester only a sharply delineated dilemma from the dominant darkness all around. Photography also describes itself from a higher level of linguistic archaeology by emerging as 'light-drawing', as φωτός, *photos* (light) and γράφειν, *graphein* (to paint, inscribe, write). Consider the strongly dramatic chiaroscuro of the 'first photograph' ever, the view recorded by Nicéphore Nièpce in 1826 from his study in Le Gras.[5] The name he gave the process through which he captured the sun's rays in an image with no human subject over a period of four hours was heliography – sun-drawing (*Ηλιος*, *helios* [sun]). Sabine Kacunko has documented the sun's attraction and blinding power [*Verblendung*] as a source of life and death in withered, dried up, crooked and bent sunflower leaves. A thematic circle which begins here has guided and been part of the artist's work ever since, up to and including her most recent project *Invincible*, in which *Sol Invictus* – the invincible sun from the Arch of Constantine in Rome – served as the source for the title of the recent piece (cf. Section 1).

Back to her first photographic self-portrait: in such a moment of self-reflection and self-representation the artist does without mirrors, resorting to the means of a silent 'exclamation' (in both an acoustic and kinaesthetic sense) with her visual 'exclamation mark', an exclamation mark as a straightened-out question mark documenting an artistic self-assertion and self-questioning. Marcel Odenbach quoted Peter Handke in a video performance entitled *Zwischen zwei Stühlen sitzen (Sitting between two chairs)* in October 1980: "It was time for a decision that was either in his power or not – but it was in any case up to him to press for it. Was he at all ready for a decision? He didn't know and he would never find out, if he didn't get into it."[6] From many conversations with Sabine Kacunko, I have come to realize how difficult it must have been for the prospective artist around 1990 to put her first artistic achievements to use in such a way as to choose one path over another for the sake of success. Wouldn't it have been easier to choose between 'black and white pop art', 'highly polished Arte Povera' and the 'stagnant Fluxus' as well as the other impossibilities of art-historical labelling and the rules of the gallery utilisation right at the beginning of her own, deadly serious development? By no means, not for Sabine Schmidt.[7] In his preliminary concept for the above-mentioned video performance, Marcel Odenbach explicitly emphasized that for him what was at stake was not just the artist's credibility and the decision that had to be taken, but also the problem of uneven distribution of material ressources and the urging of the artist into 'ideology-free' (or ideological) social niches. Sabine Kacunko has refused such a categorization of her person as an artist from the beginning. But it was her works and projects, created transmedially and transthematically, which transformed them both inwardly and outwardly, which in retrospect finally proved her right. In 1997 her photography teacher Rolf Sachsse rightly highlighted the fact that Sabine's first photo exercise on the subject of 'self-portrait', "which now appears rather a picture than a piece, contains in nuce all the elements which distinguish the work of Sabine Kacunko. The composition is simple, arranged symmetrically on a single axis, with minimal

Sabine Schmidt (Bali, 1992).

deviations, which stimulate closer examination. Tonal values are in black, white and grey with few gradations, apart from fine differentiation at the borders. The background is unstructured, remaining undefined as space."[8] This undefined space, if one can talk at all about space or time, remained just like the photographed objects or later 'bacteria pictures': "alien in their familiarity" and "oppressively close". K. Flemming wrote of the staging of Sabine Kacunko's photography "border-crossing into the no-man's-land of images and concepts", and of an undefined space that "belongs to everyone who is able and willing to occupy it".[9] In her first (mirrorless) self-portrait, Sabine Schmidt established her symbolic 'commonplace' as an artist, an already-realized utopia called 'heterotopia' by Michel Foucault, a space without representation. But she was not seeking to represent 'nothing', nor the impossibility of doing so, because she knew that this 'nothing' would depend too much on one of the extreme positions of modernity (Malevich's suprematist square and 'space', Pollock's 'all-over', or Duchamp's 'readymade'), thus becoming a simply reflexive 'something'. Sabine Kacunko has never been interested in attempts at circumvention, although she is occasionally a perceptual artist of a conceptual stamp *as well*. Nevertheless, she is no less an ontologist and, above all, a visionary too, who uses artistic media and imaging methods to refine the sought and the found, discovered and experienced beauties and truths, good and moderation, in a fine artistic balancing act with her faith, hope and love.

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The preoccupation with 'nature and self' arose subsequently and can be seen in the following photographic works: *Anschlag* (*Strike*) (1991)[10], *Der Schrei* (*The Scream*) (1992)[11], *Wandlung* (*Transformation*) (1992)[12] and *Ausblick* (*View*) (1992).

The definition of photography as a medium that suspends sizes and relationships[13] matches Sabine Schmidt's large black-and-white prints from the mid-1990s particularly well. Form and format increasingly converged, often presented in a strange frame that is, however, never to be mistaken with frames as attribute of the postmodern fury of contextualization.

Since Joseph Nicéphore Nièpce's 'sun-writing' (1765–1833, *Heliography*) and Henry Fox Talbot's 'beautiful imprint' (1800–77, *calotype*) as well as other 'co-inventors' of 'light-writing',[14] photography has acted in ways which are far from a reliable document of what, for instance, a reflex camera is capable of recording. Talbot's 'mass medium' relies from the outset on constructions of reality, but the medium of photography has never really needed to play hide-and-seek with the 'real' and the 'actual', the 'existent' and the 'imagined'. Photography's claim to reproduce reality has always been inscribed in its staged reality and been nullified within it. The definition of photography as a medium that suspends sizes and relationships still applies to the other influential parameters, form and format.[15] This is also the first thing that attracts attention

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in the large black-and-white print of the flower depicted in *Iris* (1997). It undoubtedly offers a fruitful template for a host of interpretative approaches, with its almost 'immersive' two-metre diameter and its hanging at the human eye's 'iris level'. Aspects of form and content that can barely be separated from each other take the latent conflict between the appeal of the image and fear of the image to the extreme. The gaze glides over the finely drawn lines of harmoniously undulating fibres, following them unhesitatingly, while the structure of the pattern, similar to the human 'iris', grows progressively darker and thickens into a rich darkness, turning the 'image' into a 'mirror', a dark mirror that becomes a gigantic *Claude Miroir* thanks to its Plexiglas-covered surface. The *Claude Miroir* or *Lorraine Glass*[16] is a mirror device named after the French painter Claude Lorraine (1600–82) which has been used by landscape painters since the mid-19th century – mostly in a round, portable form – as an aid for working in nature. The artist elevates to the status of a revelation the characteristic of a 'Claude mirror' to reflect its environment in a gloomy light and thus a more finely detailed way than usual, with her dark reflecting 'iris' of the flower, presented formally, technically and carefully prepared in terms of content : she grants the observer artistic absolution with *Iris,* in which (s)he is absolved of his or her image appeal and image fear, image reverence and image animosity. *Iris* indeed possesses a reformative iconoclasm and simultaneously a reverence for the image, an 'ecumenical' service to the visual art that has already become fully aware of its bondage to time and space.

If one looks closely at the *Iris* aesthetically and without bias, one notices the immediately apparent, very fine textural differences and patternings that

Sabine Schmidt, *Stillkreisend* (1991). B/w photograph, photo-linen.100 cm radius, 50 cm depth. Collection Gallery Aidan, Moscow.

provide great visual pleasure. On one hand, they evoke the Baroque's opulence and design principles; on the other, the photographic image lacks the characteristic Baroque effusiveness and, above all, any impression of movement. It has been rightly referred to this animate and yet (or maybe because of it) morbid, 'quietly circling' state which the artist perfectly achieved in the early 1990s in her cushion image *Stillkreisend (Quietly circling)* (1991)[17]. "This puzzling atmosphere of standstill, the epitome of unsettling stagnation blocks both the memory and the anticipation of the future. The gaze is caught by the abundance of the image that engages the eye just as the iris – rotating on its own axis – unveils to us the iris of the human eye."[18]

This quotation leads directly to the likewise matching inextricable relationship between photography and death that has been observed by numerous historians and theoreticians: "Just as a photograph promises the persistence of

the corporeal appearance after death, in the same way photography assumes the proportion of this promise. Having to stand between large images of small objects causes discomfort, as all disproportions do, but it helps provide some insights."[19]

The promise of death and the discomfort of the beautiful, gleaming black-and-white of the photograph reached an almost mimetic corporeality and at the same time transcended it in the aptly titled large work: *Der Große Behälter* (*The large vessel*) (1997, 182 x 96 cm). This work not only represents a carnivorous plant, but also its 'ultimate' form because it is in no need of improvement, as Klaus Flemming put it.[20] The dense network of finely chiseled water tracks reminiscent of blood vessels over the shape of the quiver narrates in the most concise way imaginable the long natural history of a functionally adaptive creature that uses its functions 'brutally' for the sake of its own survival, whose life, as clear and transparent as its translucent skin, must feed on the death of another creature. Here too, the aesthetic taste, the fascination and the *'Total Recall'* emerge simultaneously at all conceivable and tangible levels.

Moreover, the naturally and culturally concentrated historical references to an aesthetically highly impressive exclamation mark encourage art-historical parallels, particularly when one recalls the context of the successful installation of *Der Große Behälter* in an exhibition at the Hans Mayer gallery on Grabbeplatz in Düsseldorf. The print, which is over 2 m high, stood in a environement surprisingly appropriate to its nature in the ideal company of American conceptual and pop art artists such as Robert Indiana, Barry Flanagan and Keith Haring, with one significant difference: *Der Große Behälter* stood out amidst a colourful garden of images with its stoic black-and-white, alluding to a possibility that so far barely appeared (except for a few, partly *grisaille*-like portions of a James Rosenquist): the existence of something which sounds paradoxical, a self-transcending "black-and-white pop art".

By 'individualizing' photographic subjects with close-ups and extreme close-ups that have been created only using natural light and detaching them from any connections, what might consequently be called a 'historicization' of natural history takes place in the previously mentioned 'hyperreal' large black-and-white photographic works. Especially because the human seems no longer to be the measure of all things, any relevant artistic reference is and remains a statement that reflects it or is directed back at it ecologically, in the broadest sense of this term. Considering the warning function of the almost 'pop art-like', 'self-confidently' emerging photographic objects, the immaculate beauty and perfection of subjects and prints can be paraphrased as part of the comprehensive artistic programme that ultimately 'circles silently ' around death and its 'healing', around 'reality' and its slowing .

If photography can be understood as a medium that suspends sizes and relationships, then the art of photography has always acted as a medium for the suspension of media laws as well. The feeling and awareness of the power of artistic vision to exceed the medium keeps pushing art to new shores,

even in spite of potential short-term losses. But does that justify a conscious exit from the protected universe of the black-and-white photography that justifies everything? The black-and-white of photography is certainly an abstraction (on its own) from the real with an 'inscribed' reference function, as Rolf Sachsse rightly observed in a general way relating to both the photographic works by Sabine Kacunko discussed above.[21] Based on precisely calculated photographic and light technique, black-and-white photography finds, especially in the most extreme reductions of form and colour, the 'unspectacular spectacular' of its allegedly interchangeable contents (they remain interchangeable, above all, because love and death, passion and pain are not and cannot be depicted, to use Sachsse's terms).

The reality of black-and-white photography, including Sabine Kacunko's, arises from the dualism of life and death, artificiality and naturalness, from which follows a puzzling atmosphere of stasis that justifies a specific artistic quality of the examples discussed here. The almost sacral fixation of the animate in the black-and-white of photography feels even more specific. Barbara Kösters has described it in the same context as "archetypical symbols for birth and death",[22] as existentially singular, irreproducible events. Black-and-white photography releases the familiar relations of nature[23] and transforms them – giving them sense and meaning – literally into a *nature morte*. The seemingly 'artificial' engages therefore in a dialogue with the seemingly 'natural', but the context and the sense-giving element, the 'animate' of the art opposes the (formally 'dead') theme from nature and simultaneously experiences in it its persistance. In quasi-surrealist manner – as mentioned – both the expressive and pop art elements can be traced. Unlike Blossfeldt's photographs, which contain a documentary dimension or those of Mapplethorpe, who almost exclusively dedicated himself to the aesthetic, both represented photographic works – standing for the expressive power of black-and-white photography in toto – commit themselves to the associative, versatile contents that convey a specific way of observing the world. The represented realms of animal, vegetable or mineral nature are fixed in a human reference network and interpreted from a 'subjective' point of view. Especially because art history has seen so many (photographed) images of flowers and has kept producing the dialectics of Eros and Thanatos: "Yet all their work has been self-contained, self-referential and largely self-sufficient, even auto-erotic. Sabine Kacunko reverses this line of vision with her cold materials and perfect precision. She wants to communicate, to arouse, with great zest and deadly earnest."[24]

The reality of black-and-white photography mostly happens beyond trivial explanatory and classificatory relations, beyond sense-giving cultural-historical 'auxiliary lines'. According to K. Flemming, "through the medium of a camera lense and the hermetic alchemy of the dark-room, the artefact materializes. It attains its superelevation through its place in the scenario, informed both by the manner of its handiwork and its visionary stylisation. It contains all that words and thought seek to express, in toto. Moreover, it confronts the viewer plainly with a complete visual impression of almost physical

immediacy – while it remains just a fiction on a flat surface."[25] Therefore, the artistic 'method' behind both the photographs described does not lie in reaching the impossible in order to come to terms with the feasible. Rather the opposite is the case: the reality of the black-and-white photograph lies in attempting the feasible every day anew in order to come to terms with the impossible. And because consciousness of reality is still based on the difference between 'real' and 'unreal' *images* that does not exist at first sight "those intuitions become in reality neither intuitions of the real nor such of the unreal, nor perceptions, but pure intuitions. Where everything is real, nothing is real ..."[26]

BLACK AND WHITE, PRELIMINARY

I mentioned above that photography as a medium of suspension of size and relations in Sabine Kacunko's realization has also become a medium for suspension the laws of the medium. This further transformation took place around 1997 as an art critic underlined at the time: "In fact, Sabine Kacunko is an exceptionally refined post-modernist artist who does not use a medium for its own sake but as a filter for those wondrous moments that the microstructures of the universe contain. That is why she is not a photographer but an artist for whom photography is in the service of art."[27] This feeling and this insight into the media-transcending power of her artistic vision kept pushing Sabine Kacunko to new shores in the ensuing period, regardless of losses expected in the short term at least. The best and most visually striking example of this brave artistic ethos was the withdrawal from the protected, all-refining universe of black-and-white photography. In 1997, R. Sachsse wrote: "The pictures still have no colour. The black and white of the photographs and the cases and frames is itself an abstraction of the real, leading from the subject depicted to deeper levels. Love and death, pleasure and pain cannot actually be seen, in the end, neither are they the subject of the picture, which remains open. Sabine Kacunko leaves the investment of personal memories and feelings, entirely to us, the viewers."[28] The artist later recalled her resolution and loyalty towards holy black-and-white which she believed in back then, and in which she had also expressed full conviction to R. Sachsse. When she actually dared to take this step in the late 1990s, she was not universally praised for her brave decision. Some of her mentors such as Nan Hoover, for example (who took the opposite step from colour to black and white around 1986 and well knew how important such a risk was) showed hardly any understanding of this opening towards colour. One of the most important concerns of this text is to present this superficial perception of a break in Sabine Kacunko's artistic continuity as a conscious 'fractured continuity' that has to be understood even more accurately from the 'standpoint' of her present-day 'bacteria art'.

'APPROPRIATING SPACE'

Just as the "polished photographic aesthetic"[29] of her black-and-white photography was never pursued an end in itself, likewise the importance of the corresponding 'accessories' – the rather stiff frames and boxes in comparison to the energetic isolated subjects which are full of life – cannot be denied. R. Sachsse appropriately described the works with photographs from this time as "expansive" or space-seizing [*raumgreifend*]: "They seize space in a twofold manner: from us by demanding that we move in them and from themselves by referring to next, new, possible and probable, but always surprising realizations".[30] Nevertheless, they are also retrospectively to be evaluated not only as expansive intermediate steps towards later media time spaces with their simulated 'zero gravity'. Their sincere and felt protective function must be conceived and comprehended as such – a protective function that serves the pictures just as it serves their light-alienated relicts from nature that stand as representative for nature itself and promote the protection of culture (*Hörner*).

Enes Quien described the artist's approach as an "occurence within non-occurrence": "With delicate shading she achieves a simple precision of a polished photo-aesthetics, from which a balanced paradox emerges: seemingly impersonal, cool outcome of her work contains all the subtlety, even the sophistication of the feeling, plus the tenderness – ensuing from the artist's subject – ingrained in her sight and vision. This is why she gigantizes the frame: she wants to suggest the need for a more concrete, forceful, striking concentration for the sake of a vast abundance of certain natural elements in themselves and for themselves (as Kant would have it)."[31]

Because the image space kept growing concretely as well as metaphorically, the aesthetic object was also increasingly offered the kinaesthetic experience; to borrow R. Sachsse's words again: "Its placement in the installation space is often sufficient for it to be perceived as aggressive; the cases almost spring out from the wall at you. Sabine Kacunko makes use of a stylistic device of *Arte povera* that left the filling of trivial objects, simple forms and poor materials or surfaces to its observers and users."[32] The use and function of the reflecting surface like that of the dark plexiglas pane accompanied by threatening nature forms, is doubtless a part of it. Michelangelo Pistoletto, one of the most prominent representatives of *Arte povera*, could serve here as a comparison. But Harald Szeemann warned long ago against reducing goals and means of that extremely inhomogenous 'group' to the 'poverty' of the materials used. The mirror in particular was considered a luxury object and still is when made to a high enough standard. Hence, the misunderstandings and confusions as well as the alignments of works and artists from the field of minimal and pop art with those from the field of Arte Povera and Fluxus are still part of art history's unsolved problems. When Angelo Beroviero from Venice invented a method for producing transparent glass in 1460, he called it 'crystal' to emphasize its purity in comparison with the mostly greenish glass of his day. The preciousness of the material, the

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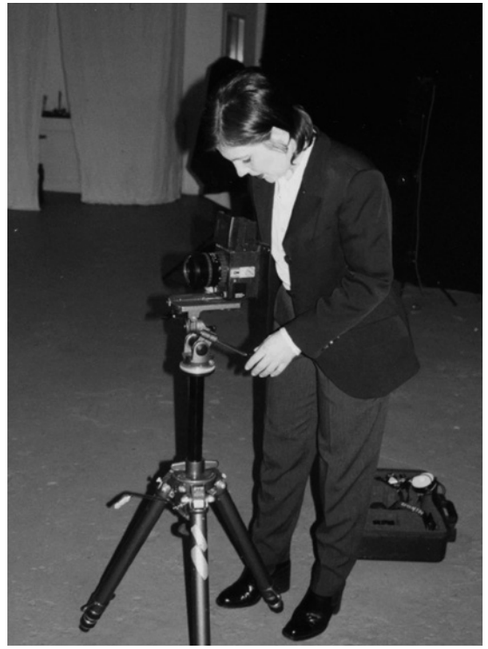
subject and the medium and its correspondingly 'reverent' artistic handling is an aspect in Sabine Kacunko's art that should not be underestimated. After all, it is only from this perspective that one can grasp the true importance of her later bacterial destructions of photographic negatives. "Pictures like Black Porcelain" (Flemming) – this aspect of her art of the late 1990s is also what her admirers recognized and classified long ago: "Sabine Kacunko's photographic works possess a fragility and simultaneously a hardness like that of black porcelain; solid-coloured, not painted, to stick with the comparison. It is no contradiction that this hardness is ambivalent and undoubtedly has poetic dimensions, just as fragility does not rule out stringency and determination. Refusal to compromise, artistic radicality in the best sense, are the spiritual-sensual ravines that force both poles to closure."[33] These strange 'natural art objects' that are always fascinated by new things do indeed share some features with the volcanic stone out of which the very first fine mirrors on this earth were made, with obsidian, the 'black mirror'. Our ancestors from the 'fertile crescent', where the first cultures originated, must have felt drawn to and repelled by the extraordinary metamorphoses of the environment reflected in the curved and polished obsidian, without wanting to take away its magic. Enes Quien has also considered such or similar forces of attraction and repulsion, when she wrote that "the appeal of her photos" lay precisely "in the extraordinary metamorphosis of these objects/subjects into floating sculptures, transferred onto the two-dimensional foil"[34].

SACRAL, CULT, RITE

It has rightly been pointed out that in Sabine Kacunko's work themes in the context of rite and cult emerge and are consequently charged with symbolic meanings. However, "this blend of meanings and impressions continues to have an effect with undiminished power even today. Sabine Kacunko is aware of these connections and it is again the carefully staged artistic exaggeration that conveys auratic density." [„diese Melange der Bedeutungen und Anmutungen wirkt auch heute noch mit unverminderter Kraft nach. Sabine Kacunko weiß um diese Zusammenhänge, und wieder ist es die sorgfältig inszenierte künstlerische Überrhöhung, die die auratische Dichte verleiht."]

100–1 *Vanitas* (1994) and *Gebärende Nacht (Parturient night)* (1997) are two examples that underline this thesis. The unspectacular–spectacular keeps
96 emerging, for example, in *Sog (Maelstrom)* (1994), *Dual* (1994) or *Lotos* (*Lo-*
97 *tus*) (1997) In Barbara Kösters' words: "The physiological gaze yields the phenomenological gaze that focuses on the multi-dimensionality of things and their perspective self. And for the artist applies from her first works that the trivial turns out to be an everlasting spaceless spectacle, the real turns out to be spectacular, a fascination emanates from it."[35] The dualism of artificiality and naturalness yields to the dualism of life and death. The negatives of the



Sabine Kacunko in her Studio, Kölner Str., Düsseldorf (8.2.1996).

large prints from *Fisch (Fish)* (1997) and *Schädel (Skull)* (1997) were exposed 103
to bacterial decay several years later, representing the foundations of Sabine 109
Kacunko's 'bacteria art'. One could speak of an anticipating closure in retrospective and in relation to the last two works. Kösters adds in an anticipatory way too:

"As pure contemplation, the works touch on the absolute, providing immediately for the nexus of mental and physical, real and imaginary, world and self, after the action in the photography has come to a standstill. This puzzling atmosphere of the standstill, an epitome of a peculiar "maelstrom", "quietly circulating" in the torpidity, into which life evanesces. At the same moment, the shutdown of the organic-animate is the ontological passage to the reality that has existed, to the origin of life, the archai, to the myth. Memories of the past, the origin? In the almost sacral fixation of the animate in the black-and-white of photography as archetypical symbols of birth and death, the artist reproduces what has occurred as existentially singular, irretrievable. No future, no past can be found in these camera works, herein lies their melancholy – in the closure of time."[36]

The fish symbol the artist likes to use, which also finds its way later into the bacteria context, can retain a hidden 'meaning', even though the knowledge of the 'conventional' value connecting both parts, the image and its signified, has been lost.[37] If the universality of this archetypical symbol enables its generalization and its spontaneous assumption, this certainly does not ap-

ply to the long symbol string created from time to time, from epoch to epoch. In this context the artist refers to the circumstance that communication and, hence, comprehension of art itself can take place only partially instinctively and autonomously. The constitution of Sabine Kacunko's work demands an analysis of meaning that is a requirement in the creation process of her large photographic objects too. The latter, however, can be undertaken only at the next conceptual and also chronological level and phase that will be dealt with in the following section.

100–01

Section III
Bootschaft[38]

The world can hardy regulate, let alone resist, dramatic and drastic technology-driven development that may as well accelerate environmental degradation. The LIFE FLAG is, therefore, a valid campaign to remind us of the dire need to strike a balance between ecology on one hand and political, social and economic development needs on the other.

Ahmada R. Ngemera, Ambassador of the Republic of Tanzania to the Federal Republic of Germany. Berlin, 30th August, 2010

For Nature, in its diversity, does not recognize the limits of Countries and individuals, and the molecular level, all living beings share the same basic language. Let us raise the LIFE FLAG in the name of life and the environment we all share.

Anita Cristina Escher Echeverría, Ambassador of the Republic of El Salvador to the Federal Republic of Germany. Berlin, August 19th 2010

Das Sichtbarmachen einer Wüstensand-Probe, die die Grundlage des Kunstwerks LIFE FLAG bildet, ist eine hervorragende Idee. Die verschiedenen Erscheinungsweisen, die dabei zum Vorschein kommen und somit zu verschiedenen Fraggenmustern führen, symbolisieren eine Einheit durch Vielfalt. Einheit durch Vielfalt ist auch da, was mein Land ausmacht. Aus dem Grund war ich sofort bereit, die LIFE FLAG in meiner Botschaft zu zeigen.

Mark Geleyn, Ambassador of Belgium to the Federal Republic of Germany. Berlin, den 19.08.2010

Das Motiv auf der LIFE FLAG zeigt eine Sequenz eines rRNA-Gens, einer kleinen Untereinheit eines Bakterienribosoms, welches an der Charité sichtbar gemacht wurde. Lassen wir uns von der Kleinheit nicht täuschen! Die Mikroorganismen der Sandprobe tragen ihren Teil zum sensiblen Gleichgewicht des großen Ganzen bei. Auch wir in Liechtenstein möchten unseren Beitrag leisten. Ihrem Projekt wünsche ihr viel Erfolg und freue mich, dass auch ein Kleinstaat wie Liechtenstein seinen Teil zum guten Gelingen der Kunstaktion beitragen kann.

Botschafter S.D. Prinz Stefan von und zu Liechtenstein, Botschaft des Fürstentums Liechtenstein. Berlin, 18. August 2010

Nos encontramos sumamente complacidos de pertenecer a este proyecto, que reafirma no solo nuestra preocupación y sensibilidad con los problemas ambientales, sino nuestro compromise de propagar el mensaje de conciencia ambiantal propuesto por el proyecto "Bootschaft" para la conservación del planeta.

Ambassador of the Republic of Panama to the Federal Republic of Germany

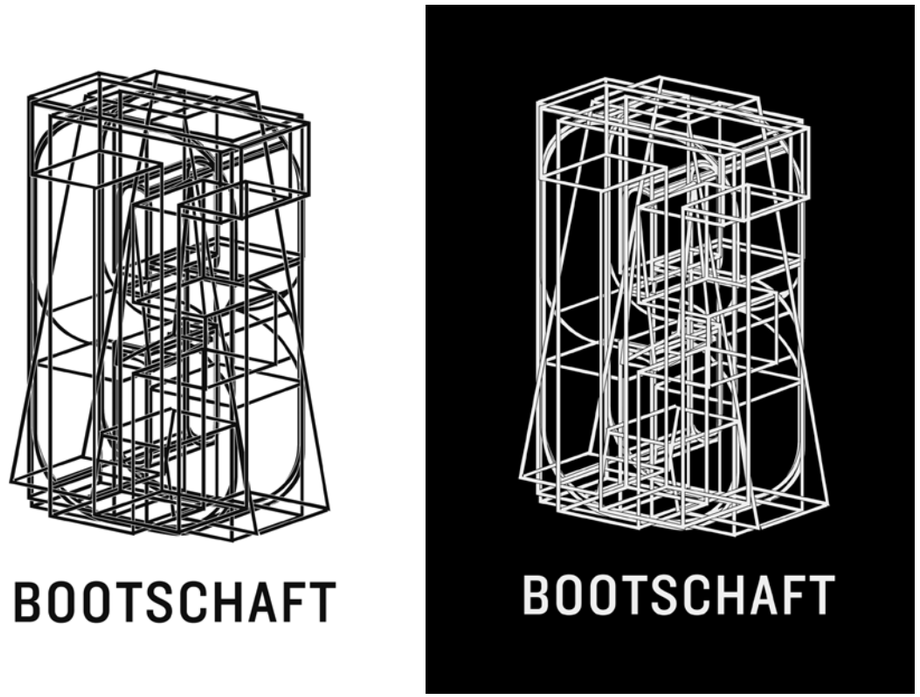
The "Unit within the Diversity" wonderfully expresses the idea of the various international Embassies accredited in Berlin, and their common aim of representing their respective countries within a worldwide challenge of promotion of peace and understanding among the nations.

Vania García Morales, Geschäftsträgerin a.i., Ambassador of Honduras to the Federal Republic of Germany. Berlin, 12. August 2010

CORELESS CORE "Coram Publico"

I first applied the neologism 'bacteria art' to Sabine Kacunko's research-based artistic installations and performances around 2003, a couple of years after she already had demonstrated her continuing interest in the microbial induced processes of deterioration by intentionally applying bacteria and fungi on her precious black and white photo negatives. The reason for the labelling was also the strong impression about the artist's extensive and ever growing understanding about the role and meaning of bacteria and biofilm in a series of exhibitions and public actions. Furthermore, her top priority was to convey the respective contents by presenting her work deliberately to as wide an audience as possible, which was virtually confronted with the term *bio-art* (in the sense of the art identified with the rather not-publicly performed lab-art). It was from this perspective that the uniqueness of Sabine Kacunko's approach set itself apart from the most of the representatives of *bio-art*.[39] Approximately two-thirds of the latter has worked either randomly or on several occasions with bacteria. However, very few of them, if any, has placed the amplitude and meaning of ubiquitous application fields of bacteria at the centre of the media public with such a programmatic consistency.[40]

If one intends to seek formative lessons and experiences regarding Sabine Kacunko's 'bacteria art', one must leaf through the books of her intensive school subjects, biology and religion. She gained her confidence to sail between the Scylla and Charybdis of religion and natural sciences by diving into the basics of the cell biology, molecular biology and the emerging ecology. The reactivity of microbes and other organic substances to their environment and, above all, the structure, the metabolism and the ecology of



Sabine Kacunko, BOOTSCHAFT – sign (2004).

bacteria in reference to the energy cycle and cycle of materials have repeatedly been a subject of her artistic interest. In densely written notebooks, the specific natural science topics can be found ranging from the general organisation of the bacterial cell and chemical reactions of species of bacteria to Micrococcus, Thiobacillus and 'jumping genes' on bacterial plasmids. They also contain notes about antibiotic resistances and corresponding 'natural monuments'.[41]

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With the bacteria art by Sabine Kacunko in mind, alleged contradictions come undone even more naturally and without theoretical constraint when biology, the life science, is regarded as a fringe science *par excellence*. Art as fringe science and bearer of 'interface aesthetics' implies in this context, the apparently creative and interpretative basics of the natural sciences and refers to the general macro connections between art and science that continuously reform and transform themselves especially on the micro-level. In retrospect, it becomes evident how the 'fringe arts' and 'fringe sciences' have found their medium in bacteria art, after the early interpenetration of biology and religion left the historical background to find a new context. The alchemy, operating preferably in the shadows, of this procreative and at the same time highly explosive mixture became the common working method of the graduate from the Düsseldorf Arts Academy in the 1990s, when Sabine

Kacunko created extreme close-up pictures of still life (in this case literally *nature morte*) by dint of daylight and thus revealed a fascinating, meaningful and important transformation. This transformation finally resulted in the bacteria art in the 2000s.

The (self-) appreciation of the individual artistic vision has become more important during the ensuing period, especially along the interface between art and technology, biology and geology. The 'truth' – as ancient Greek *a-leteia* or un-concealment – manifested itself as a mission that the most famous German visionary of the Middle Ages, Hildegard von Bingen, described memorably as: "*You have the task to reveal the concealed things.*" With her closed-circuit video installation *Product of Life* (2002),[42] Sabine Kacunko finishes probably the 'highest ranking' theme circle of her art; the circle in which 'the animate light' (Hildegard von Bingen) was 'earthed' for the first time and brought down to the micro level. The work was an interactive, large image installation consisting of slide material 400 cm high and 160 cm wide.[43] A boar skull was chosen as a motif, a large-sized black-and-white photo work of the artist (*Skull* [*Schädel*], 1997), whose negative was starting to fall apart due to colonisation by bacteria. This act of colonisation of the allegedly 'dead' by the allegedly 'living' can be marked as the beginning of the 'bacterial art' of Sabine Kacunko. The process set in motion was documented with a digital imaging procedure by using slides to present the decay of the negative from its initial stage to the advanced destruction.

With this and numerous ensuing installations under the hypernym *P.O.L. Art* (*Product of Life*), Sabine Kacunko set out in widely uncharted artistic, medial and scientific waters. She became fully aware of the related risk at the moment of setting out. This group of works remained distinctive for the next decade, for example the installation *Culture Round Culture* (2002), in which the negative was exposed to the destruction through microorganisms for the first time. Here the artist let bacteria eat an original negative with the image of a fish (*Fish* [*Fisch*], 1997). The process of the decomposing negative was projected live onto the wall with all the paradoxes showing up in this context. "*The observer becomes,*" Sabine Kacunko states in a description of the project, "*a witness of the different phases of decay and destruction. The fleeting has the potential for something completely new and different.*" This project questioned at a general level "*the present time in the context of culture and religion*" falling obviously on good ground. *Culture Round Culture* was the first realised collaboration between Sabine Kacunko and the geologist and microbiologist, Wolfgang Krumbein.[44] The fruitful dialogue between art and science in the artist's oeuvre has been deepened and intensified ever since; not least in the pursuit for the suitable mediation processes of this dialogue, which are increasingly shifting into the public sphere. (*Bloody Moon*; *Endless*)

The required analysis of the meaning behind the origination process of large-sized photo objects by Sabine Kacunko stretches *pars pro toto* from her complete oeuvre to the highlighted origination process of her 'bacteria images'. The ensuing video installations, among others *Life* (*Leben*, 2003), can

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be seen as a consistent continuation of the photographic and videographic *natura morta e viva* of the artist (Kacunko 2004, p. 728), who has been evolving since the mid-1990s. The 'artistic' thus engages in a dialogue with the 'natural', with the contents and the meaning, the 'animate' of the art opposes the formally seemingly 'dead' motif from the nature and experiencing simultaneously its continuous living in it.

The early and interim phase of Kacunko's work was followed by the project *SAY(IL)ING* [*BO(O)TSCHAFT*] that has been realised in several stages. This project focuses primarily on the objects in the public sphere with a particular cultural or ecological background. The starting point creates the increasing excessive demand of the bearer of democratic decision-making processes under globalised conditions of medial and any other hyper production. In this regard, according to the initial analysis of the artist, it is becoming more and more important to illuminate both metaphorically and factually the individual contents, among which are the surfaces of natural and cultural 'sayings', and thus to visualise their meaning and significance. By using existing and newly visualised techniques, the patina of an object (e.g. a public building) would be projected onto the surface of the same object as a live video image. Thanks to the medial visualisation of its microscopic structure, the 'history' and the 'present' of the illuminated object and its surroundings 'unwind'. It is meticulously demonstrated, documented and presented to the public for reflection and discussion. It transforms the new medial and material presence of the represented object into a cultural subject. This constellation of observed and observing subjects evokes the tendencies of the present interaction with the 'objects' and 'subjects' of the natural-historical and cultural-historical 'things' and 'agencies'. These tendencies were first put forward by Bruno Latour and later widely adopted. (for critique of Latour's position cf. section 5)

The 'contextually fixed' interaction with the visualisation techniques gains relevance and topicality through the interlocking of technology, culture, ecology and economy, which obviously does not orient itself primarily to economic growth. The growth that Sabine Kacunko acts on, however, contains the logic of the above separate disciplines in the age of (as to referred by Latour) 'techno cultures', by focusing on their mutual 'resource-materialistic' fundamentals and future prospects. (cf. Kacunko 2010) The project *BOOTSCHAFT* was, in this regard, based upon a seemingly simple 'observation': microbes produce the natural patina. Under the influence of the micro-organisms, temperature, wind, air, water as well as chemical and organic substances solved in them, create a protective film, which adheres on the dusty surface of an object like a fingerprint. The natural biofilm – the 'patina' – protects objects from decay as analogous memory of the past. Art, in this context, acts as a 'guardian' of this sensible protective layer, which (re)presents simultaneously a medial-material 'natural-analogous' bearer of culture/nature.

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PATINA

The term 'patina'[45] shows especially clearly the politically shattering effect concealed in the recognition of the beauty of irreversibility and what kind of aesthetic and perception-psychological aspects the acceptance of the patina involves. While some look at the elimination of traces of time as an "*intolerable 'face-lifting'*" that "*negates the history of the objects*" (Toyka 1996, p. 7), some attribute it with 'dignity' and a protective function. So far, unfortunately, it has not gone beyond wishful statements that questions of patina should be asked, not least perception-psychologically but also "*based on what criteria the rejection or acceptance of patina is defined consciously or unconsciously. So where is the border between pollution, decomposition, destruction on the one hand and the acceptable signs of use of age-related colour shifts and any patina on the other?*" (12)

The *Naturalis Historiae* by Pliny the Elder handles the subject of the surface treatment of bronze statues or questions about the reflection of real bronze signs much more rationally than modern times; with J. J. Winckelmann on the one hand, and the Romantics on the other. Art and science have seldom been in the position to mediate consciously and effectively between the yearning for a lost life in accordance with nature on the one hand and the future utopia on the other hand. The rightly oft-quoted *[The] Lure of Antiquity and the Cult of the Machine* (Bredekamp 1993) was thrown out of the mutually-dependent balance on the release of the influential study of the same name from 1993. The borderline between the patina – conceived as protection and seen as ruin – is also the interface where art and nature, matter and spirit as well as philosophy, religion and other views intertwine in a particularly pronounced way. (Art) history is both *read*able and *measur*able from the patina as from a biofilm. The relevance of the patina and its microbial condition for natural and cultural history does not only result from the relatively new ascertainment of geology that the bio-erosion (caused by the colonisation of bacteria and other microbes) has stronger impact on material than, for instance, wind erosion. We also learn from it that the balance depends equally on material and environmental influences; the micro level and the macro level. If one wanted to express it in W. E. Krummbein's words – put bluntly – one could say: "*Nothing is dirt, everything is life.*"[46] From this conscious 'vitalism-suspecting pseudo animism' not only can the new research priorities and fields of the modern art be derived; but politically sensitive issue of the preservation of monuments, their publicity and sustainability are put into a new perspective as well. The fact is that nowadays the "*decision about monument worthiness*" is "*no longer in the hands of the public or public force*" but "*partly at the discretion of a segmented public or even an individual person*" (Ratzmann 2008, p. 41) – these facts also have to be seen as a consequence of privatisation strategies, the strengthened will for the power of images, their digital storage and complete attribution as well as manipulation.

ENVIRONMENT

In the decades since Ada Lovelace's time, many of the achievements of artists and scientists have been ignored and it would be meaningful and purposeful nowadays to re-evaluate the opportune constraints of the defiant positions with respect to the globalised and networked, curricular, military and commercial science, military and economy. (cf. representatively Ryan 1992) Sabine Kacunko asked a number of questions with her project *SAY(IL)ING [BO(O)TSCHAFT]* referring directly to the principles of 'lab art' that obeys the 'techno sciences'. The public space turns into a lab, in which the interrelations of things or creatures with their environment is analyzed and continuously communicated. The precarious relationship between wind erosion and bio-erosion (bacteria and other microbes) is, for example, analyzed between the analogous and virtual public space. While sensual perception on the one hand and mechanical measure on the other hand, enter into a (self)-confident opening dialogue, the so-called aesthetic experience of the recipients remains oscillating at the interface between various concepts. In particular, the question about the condition of cultural goods in the context of a sustainable development is put forward.

Not only does the currently widely discussed system 'environment', often reduced to temperature affected changes, become an artistic subject. But also the system 'material', the microbial biofilm and the intercontinental migration of bacteria by means of desert dust come to the fore. Sabine Kacunko explains the issue of the desertification by using the example of the expansion of the Gobi Desert and China's efforts to stop this tendency with the project 'China's green wall'. For the interactive installation *SAY(IL)ING – HAN HAI* (*Dry Sea*), presented in Beijing in October 2009, microscopic image files of cultures of fungi from the Gobi Desert were produced. The microcosm of the cultures of fungi from the 'desert patina' grown by Anna Gorbuschina (BAM Berlin) was projected onto a screen, but the more exhibition visitors that entered the room, the more the patina image faded away, the less the pristine ecological and aesthetic balance persisted.

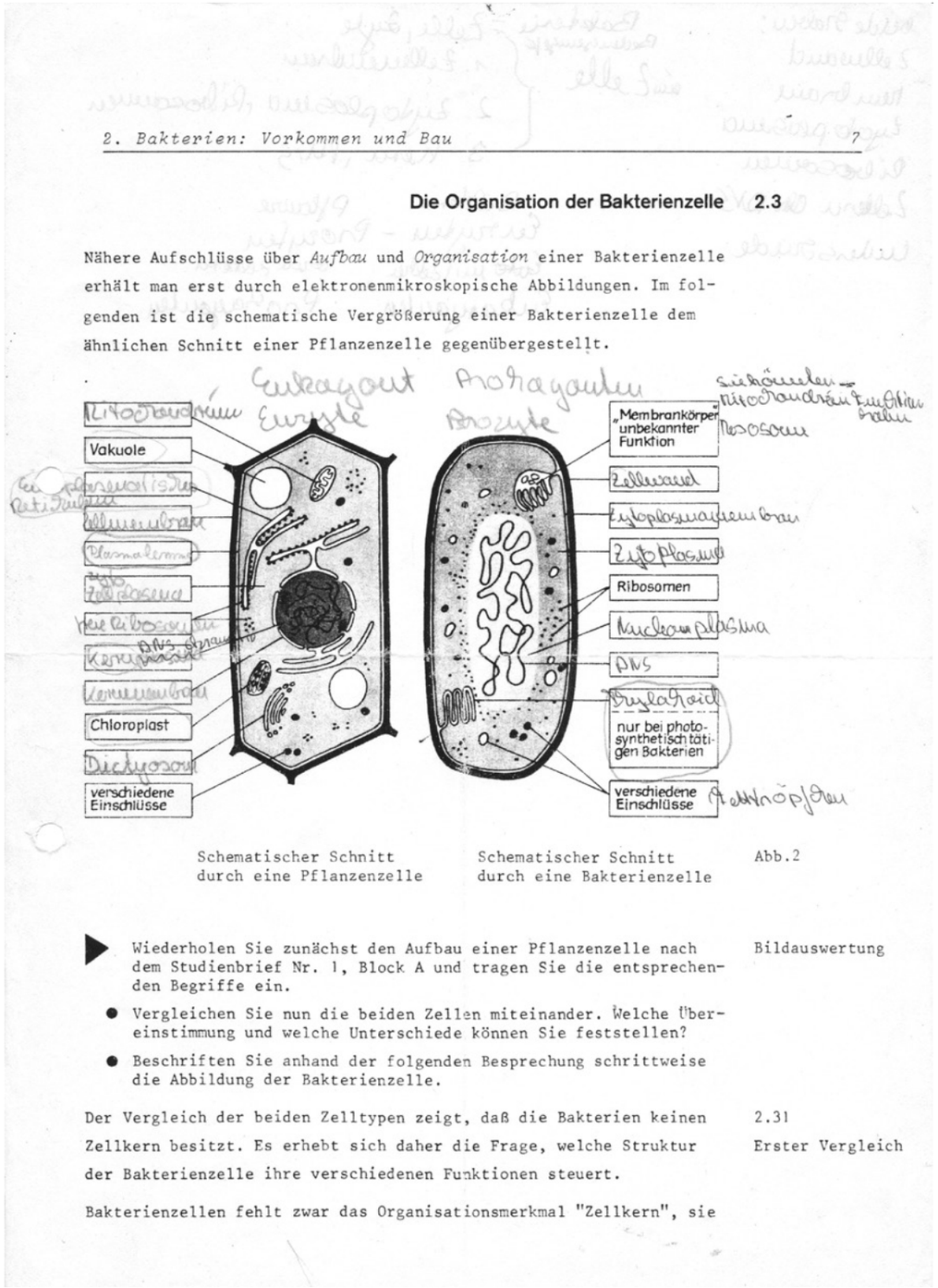
A year later Sabine Kacunko managed to create another diplomatic piece of art, in which the appellative aspect stepped out of the shadows of the visualised processes even more. On the occasion of the 300th anniversary of the Charité Berlin, an exhibition and art action titled *LIFE FLAG – NEWS FROM EVERYWHERE* took place at the Robert-Koch-Forum / Institute for Microbiology and Hygiene as well as other places in Berlin in October and November 2010. The project was undertaken in collaboration with the Institute for Microbiology and Hygiene of the Charité Berlin and the Federal Institute for Materials Research and Testing (BAM). The complete action picked out the ecological, political and economic balance and both conscious and unconscious human activities involved in it as a central theme and reflected them within the frame of Berlin's scientific year 2010. The project consisted of a series of different media art actions and events in the public space. Its focus was on the efforts for a synthesis out of economic growth and envi-

ronment protection as a challenge for the 21st century. The densely distributed network out of 129 embassies in Berlin – the European capital with the most diplomatic representative bodies – was used for the circulation of the *BOOTSCHAFT*, which, printed out literally on flags, had a divided awareness of ecological concerns together as a motif, metaphor, model, material and
161–165 medium. The participating 75 embassies received the *LIFE FLAG*, a flag with the same motif, which was flown in all the embassy buildings for a week. The presentation of microorganisms was chosen as a basis for the motif. Their 'protein factories', the so-called ribosomes, were coloured with molecular-biological technologies, FISH (*fluorescence in situ hybridisation*) diagnostics, by a team at the Institute for Microbiology and Hygiene at the Charité. The thus visibly made ribosomes appear both in bacteria, plants and animals as well as in humans. In the process a new subunit of the 16s rRNA sequence was discovered that occurs in plants, animals and humans and the artist as
169–173 its discoverer named this '*Oceanobacillus Pulvirenatus*' – 'Dusty Rebirth'. The bacteria cultures originated from a historically unique dust sample from the Sahara Desert, which Alexander von Humboldt received as a gift in 1823. Today the sample is in the Naturkunde Museum Berlin and is property of the Ehrenberg collection. The Berlin action was also the starting point for further art actions that were continued over the globally spread network of embassies (and on the Internet too).

The question that arose here was and is: What particular meaning can such invisible processes to the unaided eye have for us?

First, there is certainly the meaning of the operation matrix of our biotechnological age, in which molecular biology, above all genetics, in connection with computer technology as bioinformatics, amalgamate into a new powerful technological reality. The possibility for isolation, identification and recombination of genes thus makes the gene pool of our planet accessible as a primary raw material resource. *LIFE FLAG* used the methods of recombination in the service of a *BO(O)TSCHAFT / SAY(IL)ING*, which addresses the application of ecological and human resources as well as art and science as sources of collective knowledge. In this way Sabine Kacunko used this project, again, not just as an appellative or utopian art, but a deeply realistic one, since it was based on existing networks. Not only the virtual networks of the Internet but the naturally and culturally analogous networks of embassies and messages, the representatives of the humankind.

Second, the issue of the meaning of invisible processes, which *LIFE FLAG* supported, was likewise visually addressed. The extremely efficient, pigment-forming micro-organisms that were displayed on the surface of the *LIFE FLAG* make sure that one can rightly speak of the smallest biological causes with greatest aesthetic impact. A social plastic (maybe not entirely in the sense of J. Beuys) without the stagnancy of a sculptural form, but an animate transformation – a message, so to say, made sure that the artistic process was grasped as an emergence of culture as an expression of the transformation of nature. *LIFE FLAG* served as a symbol and metaphor for this transformation of the animate, which represents its constitutive condition.



2. Bakterien: Vorkommen und Bau 7

Die Organisation der Bakterienzelle 2.3

Nähere Aufschlüsse über *Aufbau* und *Organisation* einer Bakterienzelle erhält man erst durch elektronenmikroskopische Abbildungen. Im folgenden ist die schematische Vergrößerung einer Bakterienzelle dem ähnlichen Schnitt einer Pflanzenzelle gegenübergestellt.

Vakuole
Chloroplast
verschiedene Einschlüsse
„Membrankörper" unbekannter Funktion
Ribosomen
nur bei photosynthetisch tätigen Bakterien
verschiedene Einschlüsse

Schematischer Schnitt durch eine Pflanzenzelle — Schematischer Schnitt durch eine Bakterienzelle — Abb.2

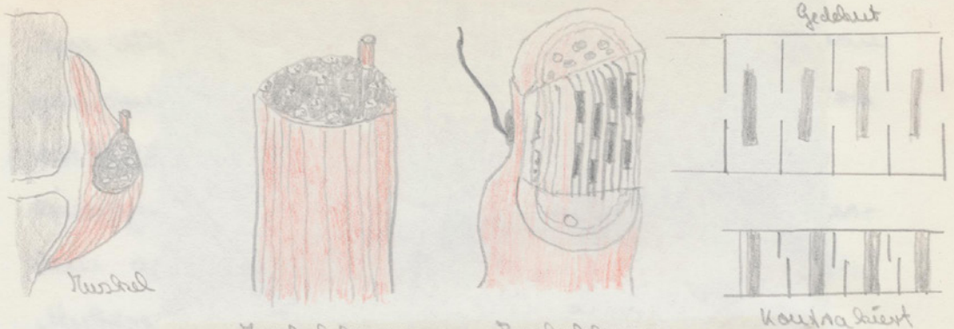
▶ Wiederholen Sie zunächst den Aufbau einer Pflanzenzelle nach dem Studienbrief Nr. 1, Block A und tragen Sie die entsprechenden Begriffe ein. — Bildauswertung

- Vergleichen Sie nun die beiden Zellen miteinander. Welche Übereinstimmung und welche Unterschiede können Sie feststellen?
- Beschriften Sie anhand der folgenden Besprechung schrittweise die Abbildung der Bakterienzelle.

Der Vergleich der beiden Zelltypen zeigt, daß die Bakterien keinen Zellkern besitzt. Es erhebt sich daher die Frage, welche Struktur der Bakterienzelle ihre verschiedenen Funktionen steuert. — 2.31 Erster Vergleich

Bakterienzellen fehlt zwar das Organisationsmerkmal "Zellkern", sie

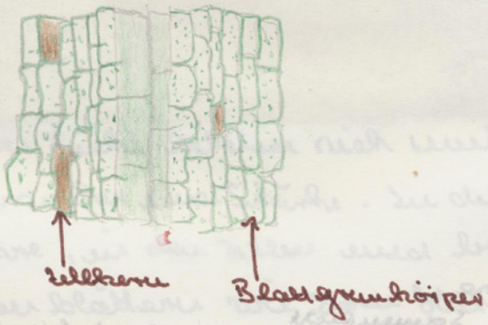
Sabine Schmidt, notes from the school-studies of bacteria and cells (1977).



Glykogen (Zuckerverbindung) wird abgebaut zu Traubenzucker. Dabei entsteht Brenztraubensäure → Sauerstoff → Wasser und Kohlenoxid.

Glykogen
↓
Traubenzucker
↓
Brenztraubensäure
↓
Milchsäure

Die Zelle



Sabine Schmidt, notes from the school-studies of bacteria and cells (1977).

Bakterien	Reaktionen
Micrococcus	$5\,H_2 + 2\,NaNO_3 \rightarrow \uparrow N_2 \uparrow + 2\,NaOH + 4\,H_2O + 34{,}6\,kcal$
Thiobacillus	$5\,S + 6\,NaNO_3 \rightarrow \uparrow 3N_2 \uparrow + 3\,Na_2SO_4 + 2\,H_2SO_4 + 617\,kcal$
Denitrificanten anaerob	Reduktion Denitrification

- Die Pflanze braucht NO_3 zum Aufbau von Proteinen (jede Zelle besteht aus H_2O und Proteinen)

Denn kein O mehr vorhanden ist, erfolgen Reduktionen anstatt Oxidationen. Statt der Nitrification erfolgt eine Denitrification mit Hilfe von Denitrificanten (Anaerobier). Dabei entsteht nun freier Stickstoff. Für die Pflanzen ist dies ungünstig, da sie freien Stickstoff nicht aufnehmen können bzw. nicht verwenden können. Dadurch geht er verloren.

Positiv ist immer eine Nitrification zu sehen, da dadurch für die Pflanze die notwendigen Nitrate entstehen.

Das Stickstoffgeschehen ist notwendig für den Proteinaufbau.
Die Pflanze bekommt den Stickstoff durch Nitrationen (Enthalten im Bodenwasser). Die Pflanze kann zwar

Sabine Schmidt, notes from the school-studies of bacteria and cells (1992).

BACTERIA

Since the successful reanimation of the historical dust sample in *LIFE FLAG*, the artist has made further visible traces in the dust the subject of her investigation. The 'reanimated' bacteria cultures created digital and analogous 'sayings' / *Bo(o)tschaften*; they became the centrepiece and initial point of the ensuing media installation and other projects. In these projects, the blunt beauty of the bacteria culture in its other, all-embracing meanings was brought to the public's attention. Sabine Kacunko repeatedly points out in her projects the multiple 'functions' or views that the bacteria convey to us. They function first as living solar cells. The earliest known so-called *archaea* or *archaebacteria* were the blue-green coloured cyanobacteria, which built the material as marine blue-green algae and make up the stromatolites (nodular calcifications) in Australia. (Lesch & Zaun 2009, p. 17.)[47] The blue-green pigmented cyanobacteria, thanks to the chlorophyll l they contain, are regarded as 'inventors' of photosynthesis, that (including the carbon dioxide by means of light-absorbing pigments) is responsible for the transformation of sunlight into chemical energy. They thus created their own metabolism and ability to reproduce (asexually, by division) making the bacteria unlike the equally old, resistant and metamorphic (but still captured between 'life' and 'death') viruses into the 'animate' creatures in the most accepted sense of this word. The second 'field of application' of the bacteria here described in an artistic, scientific and epistemological context, is associated with the 'second nature' of bacteria: pigment formation. The bacteria act as living pigments and are hence responsible for the perceivable diversity of our world. The micro-organisms produce in their metabolic processes pigments as waste products and thus a new artistic-aesthetic experience. Apart of the soft-focus impact of the affected surface the specific aesthetic appeal of the thus emerging 'natural' – and in the case of the 'bacteria art' by Sabine Kacunko also 'artistic' – patina, lies, above all, in its colour. The subjective 'nature of colour' receives, however, through the artistic intervention its objective, resource-technical 'grounding', by putting the bearer, the molecular processes responsible for the pigmentation, at the centre of attention. The colour of the respective object contains its subjective constitution traditionally, first through the implementation of idealistic chromatics. And second, the colour of the object is physically seen and determined by the wavelengths and intensities of the light emerging out of it – through its ability to reflect. This view, too, contains subjective elements through the change of the observer's position. Philosophers like Ludwig Wittgenstein or Ernst Cassirer demanded at the beginning of the 20th century to correlate the physical, philosophical and also art-theoretical reflection to 'colour'. Rightly so it was suggested that a polemic of the natural philosophy against the physical observation of the light would be amiss.[48] Particularly interesting with regard to the bacteria art of Sabine Kacunko, is the 'ambivalent' function of melanin, whose impact still does not seem to be understood despite intensive experimental researches. Melanin as black pigment is responsible for colour changes on the surface. In other words, they are responsible for the 'patinisation' of mineral substrates[49], but their impact has a protective as well as a destructive force. Comprehension of the relation between the ecology of the micro-organisms on surfaces and the radiation to which they are exposed – of the 'material' and its 'environment' – could possibly be reached also through a genetically controlled intervention into the production of photoactive melanin. The 'ambivalence' of melanin as a ('protective', unreactive) stable radical lies also in its light sensitivity, because under the influence of light, sulphurous pheomelanins they can create free ('destructive', reactive) radicals.

In Sabine Kacunko's work notes there are, amongst other items, references coming from the Max Planck Institute for developmental biology[50] taken on 4th September 2003 about the evolution of social swarming in bacteria, a subject that adds another quality to the abilities of these micro-organisms than those already discussed. The references relate to the 'social' difference between the wild types of the soil bacterium, *Myxococcus xanthus*, and its mutants. While the former swarm together on soft fertile soil (*Agar*), their non-social mutants lose certain extra-cellular extensions (*Pili*).[51]

Generating artistic value out of such molecular-biological proof of the social behaviour of bacteria could not succeed without further ado after everything that has been said *if* the verifiable development of a matching artistic concept is missing. To Sabine Kacunko it was, however, important to refrain from easily digestible parallels at this undoubtedly tempting point. This parallel between people, social animals and many kinds of bacteria on the one hand and the survival behaviour of our entire ecosystem with the people at the top on the other, reaches deeply into the insights and assumptions about 'life' previously discussed. It is especially interesting that the 'ambivalence' of bacteria mentioned above is shown in the context of patina formation, which relates to the destruction and the protection of the respective substance. Its 'social behaviour' and 'cooperation' goes so far in the *Myxobacteria* (to which the *Myxococcus xanthus* belong) that they gather in large groups in order to swarm over surfaces and chase and kill 'victim organisms'. If they find conditions particularly austere, they unite in groups of up to 100,000 *Myxococcus xanthus* cells, which then create a three-dimensional semen structure in order to survive the lack of food, drying out or heat. The bacteria clearly do not even fear 'self-sacrifice' in the service of the whole, which certainly should not be seen as a contradiction to the formation of their 'individuality'. The mass expansion or swarms of bacteria is presumed to be the first step in the creation of biofilms, including 'organic dust'. In this process we see the development of something similar to the short-term and long-term memory of the bacteria. A daughter cell 'learns' and 'decides' faster than the parent cell.[52]

CRYSTALS

One year after the *Life Flag* project in Berlin, the media art project *SAY(IL)ING – CRYSTAL MIRROR* was presented at the Ecole des Beaux-Arts in Paris on 27th November 2011.[53] In an accessible media sculpture made out of

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carbon there was a video microscope, beneath which was a Petri dish, which contained animate cell cultures that could be experienced in an audio-visual manner. The cells in question were the historical bacteria culture from the Ehrenberg, which had also been the starting point in *BOOTSCHAFT – LIFE FLAG* and were reactivated or 'reanimated' by Prof. Dr. Anna Gorbuschina. Images of the growth process of the reanimated bacteria cultures were transmitted live on the Internet and were thus accessible on the project's website for virtual visitors. The carbon sculpture referred to the coordinates of the Pyramid of Cheops and consisted of the reflection of the pyramid apex in an octahedron, to which ultra sound spots were attached. By using special developed software, the bases of the bacteria cultures' DNA were transformed into tones and by using the current wind coordinate on site they were output as sounds and thus passed onto the external world. The desert dust was originally found in Calabria and handed to the humanist Alexander von Humboldt in Paris in 1823, who then submitted it for evaluation in Berlin. It was determined that the dust originated from the Sahara and had been carried over the trade winds to Italy. This was the first scientific proof of the correlation of various ecosystems. The micro-organisms from the Sahara Desert today feed further ecosystems on their way to Europe, as well as the rainforests in South America. The Sahara dust reaches Paris via a strong south current over the Mediterranean and the Alps. The winds bring plant nutritive substances such as calcium, magnesium or microorganisms with the North African dust. Dust, sand and organic material have permanently been transported from the barren dry desert of the Sahara to the tropical rainforests of South America by the wind.

The 'rebirth' of an almost 200-year-old bacterium as a product of interdisciplinary collaboration and the productive interplay of culture, politics and science is seldom so strongly associated with a historical personality like Alexander von Humboldt. The German humanist lived and worked in Paris for many years up until 1827. As is well known, there were many practical aspects to Humboldt's research work. Human beings were supposed to be allowed to use nature as sustainably as possible.[54] This narrative was conceptualized and reflected in the structure of *CRYSTAL MIRROR*.

ASYMMETRY

At this point another fascinating aspect of the social life of bacteria arose, both in artistic awareness and as an experiment in praxis. This aspect adds to the three mentioned characteristics of bacteria, thus temporarily closing the circle around 'life', 'death' and the 'dusty rebirth' in the artistic work of Sabine Kacunko. But here it is necessary to turn once again to a contemporary of Robert Koch. Around 1860, Louis Pasteur noticed that polarised light rotates by 7 degrees in natural tartaric acid, but not in synthetically produced tartaric acid. Natural tartaric acid, which contains only one kind of crystal, is optically active and therefore rotates the polarisation level of the polarisation light. The synthetically produced tartaric acid, on the other hand, contains two kinds of crystal, one of which is merely the mirror image of the other. The mineralogist Pierre Curie continued to develop thoughts on the difference between 'animate' and 'inanimate', before it was finally presented in 1926 by his Ukrainian-Russian colleague, Wladimir Iwanowitsch Wernadski, as the "Pasteur Curie principle of dissymmetry". From this demarcation line between animate and inanimate systems in relation to symmetry differences between crystals and creatures, Wernadski derived that one can distinguish a biological from a physical space-time continuum. (Krumbein & Levit 1997).[55] Following Pasteur, Curie and Wernadski's biogenic dissymmetry, natural minerals (in accordance with the 32 crystal classes of the Euclidean order) are inanimate, whereas natural organisms (entities comprised of molecules similar to minerals) are animate. Whilst constantly symmetric minerals can form, at maximum, an hexakis octahedron or can comprise 48 hedrons in their most advanced form (such as a garnet or a carbuncle stone), organisms have greater numbers of levels of symmetry, with more complex forms than an hexakis octahedron, albeit without being precisely symmetrical (left and right brain hemisphere, left and right hand, both single strands of a DNA double helix, and so on). That is why the creation of dissymmetry in biological membranes can be regarded as what has long been believed to be the difference of the 'animate' (dissymmetrical examples from biology include amino acids rotating to the left and right, carboxylic acids, and sugar). The dissymmetric or animate state is maintained, according to geologist, W. E. Krummbein, "*through the animate matter using cosmic means (solar energy and stardust) against the thermodynamic laws. It marks explicitly the topology (phenomena) and mode of operation (processes) of the neuronal cells and systems (networks), but not those of the computers that are symmetric and work symmetrically.*" (Krumbein and Levit 1997, p. 35)[56] It follows from this theory, for example, that human life and its end might not be connected with brain function. Bacteria and other collections of atoms were proof of this (they 'live' without brain function) and digital computers were used as negative examples. A thesis which set invisible, yet fundamental, irreversible boundaries to the range of biosciences. Herein lies a real chance to use productively and synergetically (certainly not in the sense of their economic usability) the connections between art, science, philosophy, religion and other views, as well as life praxis.

"*Life is the dynamic process of the symmetry breaking using energy in the dyssymmetric system between membrane enclosed cell incident dependent on the entropy and the forceful temporal feedback with simultaneous like earlier (fossil) dyssymmetries, fossil biospheres, out of which the current earth extracts energy and material sources.*" (ibid.)[57]

Viewing 'life' as a fundamental activity of the biosphere, conceived as a highly organised system of matter and energy, leads to a long overdue notion of the dynamic balance of the eco-system of Earth and, under favourable conditions, to the possible prevention of our premature death in a bacterially-dominated system. Bacteria yield an almost infinite diversity of colours,

structures and interactions with the environment. The bacteria art of Sabine Kacunko shows us clearly the mapped asymptotic convergence of instrumental questions and questions of meaning. One of the founders and probably the most influential personality in international biosemiotics, Jesper Hoffmeyer, arrived at a very similar outcome in the description of asymmetric cell membranes as output sources of 'unpredictability' and 'life':

"*From a semiotic point of view the decisive step in the process that led to the origin of life was the appearance in the world of a new kind of asymmetry, 'an asymmetry between insides and outside.'* (Hoffmeyer 2010) *The formation of a closed membrane around an autocatalytically closed system of components … 'Such a stable integration of a self-referential digitally coded system into an other-referential analogically coded system may perhaps be seen as a definition of life.'*"[58]

From this mediative and easily balanced position between analogy and digital biologism, a position that wants to avoid a 'semantic cut' (and which Hoffmeyer was able to maintain through a double, analogous-digital coding[59]), the relevance of the complete artistic-scientific project of Sabine Kacunko can be appreciated, which has acquired relevance beyond the versatility and multiplicity of the visualisation technologies used and crosses the narrow circle of art and its history, the art market as well as natural and cultural politics. The principle of recording, processing and reproducing the invisible in the context of the visualisation methods and strategies in art of the 20th and 21st centuries can be understood by looking at the *SAY(IL)ING* project beyond the artistic-aesthetic dimension as an epistemiological model, as a social metaphor and also as a test case of interactivity. However, this project demanded an artistic-scientific method of continued persistence, which spared no efforts in assessing a triple parallel between the development of the media engineering, modern and contemporary art and culture and the corresponding theory formations. The project *SAY(IL)ING* by Sabine Kacunko heads in this direction exactly, like the recent work entitled *Looping Life* (2013).

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Connecting the open-for-interpretation surface of images with the development of art and media history, gives the most insightful approach to access Sabine Kacunko's work. The impossibility of penetrating the shown work beyond the surface of the artist's images inevitably poses the question about the meaning and expressiveness of the (re)presented formation and decay processes of the photographic, videographic and digital image. From the chaos and the method, with which she artistically perpetrates death and its healing, Sabine Kacunko has unlocked an interdisciplinary field of research, in the best sense of the word, whose outcomes contribute to the pivotal issues: the meaning of art in an engineered society and to what extent art is still able to visualise, interpret and represent the world in the media age. In the following Section 4, I will rewind this interdisciplinary research field to the future by relating it to the nexus of artistic, scientific and humanistic approaches in the context of the emerging Big Bacteria research network, confining it, however, to the potential benefits of an integrative health- and heritage-related approach.

Section IV
Big Bacteria for Micro Humans

> And Aetna that glows, with its sulphurous furnaces,
> was not always on fire, and will not always be on fire.
> For if the earth is a creature, that lives, and, in many
> places, has vents that breathe out flame, she can alter
> her air passages, and as frequently as she shifts,
> she can close these caverns and open others.
> Or, if swift winds are confined in the deep caves,
> and strike rock against rock, or against material
> containing the seeds of fire, and Aetna catches alight
> from the friction, the caves will be left cold
> when the wind dies.
>
> Publius Ovidius Naso, *The Metamorphoses*, Bk XV:143–175 Pythagoras' Teachings: Metempsychosis, Bk XV:307–360 Pythagoras' Teachings: Physical changes

> By wind a fire is fed, by wind it is extinguished: light
> breezes fan the flames, heavier gusts will kill them.
>
> Publius Ovidius Naso, *Remedia Amoris* (The Cure for Love), Part XVI: The Doctor's Last Advice

> Do you not see how the larvae of the honey-carrying
> bees, protected by the hexagonal waxen cells,
> are born as limbless bodies, and later acquire legs,
> and later still wings?
>
> Publius Ovidius Naso, *The Metamorphoses*, Bk XV:361–390 Pythagoras' Teachings: Autogenesis

HEALTH- AND HERITAGE IN FOCUS OF ARTS AND SCIENCES

This section will focus on important aspects of a research interest that still is in its infancy, and therefore upon the future as well – to an integrated mode of health- and cultural heritage research. With Sabine Kacunko's bacteria art in mind and with reference to the research network that has been emerging as part of her artistic and collaborative work, alleged contradictions between the cultural and natural heritage- and health-issues will be briefly commented. By providing methodological bridges and model cases, Sabine Kacunko's *Invincible* contributes to the joint ambition of the emerging Big Bacteria network to advance the 'transitory' resort between the Arts and Sciences which I wish to call 'Micro-Humanities.' Building a Big Bacteria network pools a wide range of disciplines to address the above-mentioned proverbial diversity, variety, ubiquity and other well-known superlatives of bacteria, and connects experts, colleagues and friends from Italy, Germany, Denmark

and other countries engaged in, but not confined to the nexus of health and heritage research. By supplementing the visual culture approach with the one based on material culture, the growing impact and understanding of the non-human agencies, aggregates, colonies and materials demands deliberate discussion about the convergences and bridges between the fields of research mentioned and artistic practice.

METHODS AND MODELS

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Apart from the attempts to overview and systematize strands of methodology, we remain well aware of the fact that the different approaches and alleged research mentalities in Arts and Sciences appear always in different light, respectively, also producing clichés and methodological shortcomings. Being situated between art and the sciences and in the named context, we see our interest in helping to provide the material and conceptual bridges between the 'hypothesis'-proof-methodology of the sciences and the allegedly 'heuristic' approach of the arts.

The first convergence or bridge, as we see it, is that of environmental and medical microbiology as conveyed via biofilm. I became acquainted with this fascinating and surprisingly new research field back in 2004 through Sabine Kacunko's collaboration with a geologist, sedimentologist, and microbiologist Wolfgang Krumbein (Prof. Emeritus from the University of Oldenburg).

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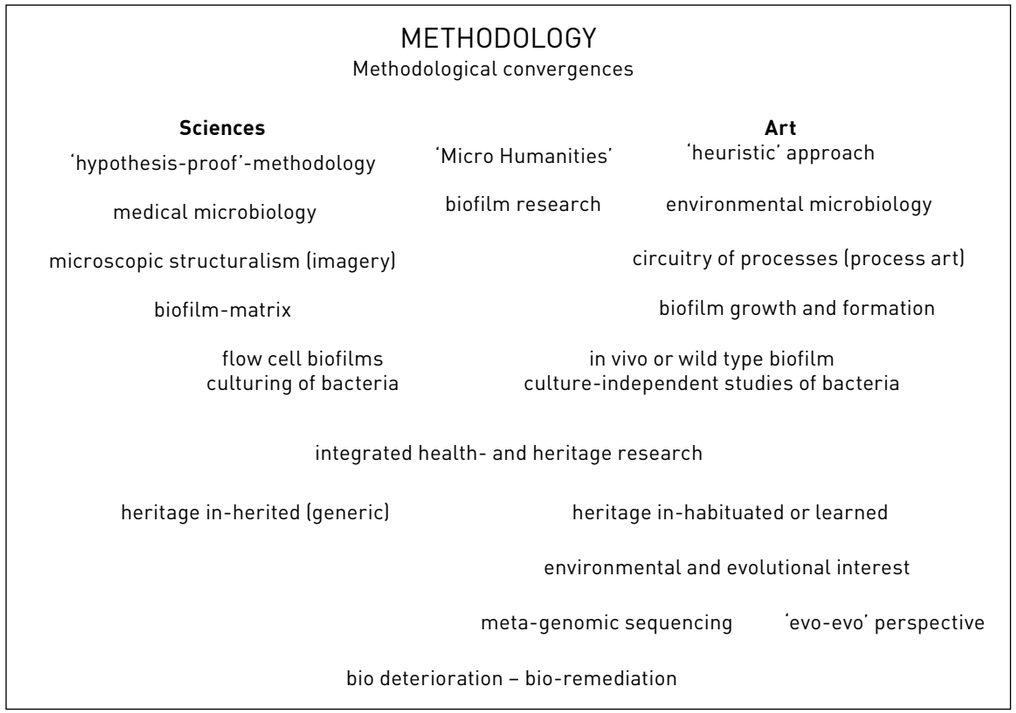
In the 1980s, Krumbein pioneered research into hypersaline ecosystems and especially the biofilm as sites of biodeterioration (breakdown of materials by microbial action). and bioremediation (the reverse process of 'curing' of the substrate via microbial action). As Thomas Bjarnsholt rightly emphasizes in his doctoral dissertation[60], biofilm research is anything but an exact science. Therefore, we recognised its potential as a likely 'booster' for research integrating Health and Environmental Sciences. The convergences or bridges between environmental and medical microbiology reveal deeper layers of our methodological interests. One of them is the dialectic between what I would like to call the structuralism of microscopy on the one hand and the circuitry of processes (including process art) on the other[61]: Both approaches related to either or both microscopy and live-transmission are evident in artistic practice such as Sabine Kacunko's, when the decision must be made to use either "live" specimens and light microscopy or "dead" ones and electronic microscopy. Emergent fields of study like metagenomic sequencing are a good example of what we would like to label an environmental approach. In this case we can safely indulge in a little hyperbole and speak of the difference between the interest in cultural diversity on one hand and non-cultured microdiversity on the other. The latter, in turn, confirms bacteria's role as key players in larger ecosystems while the metagenomic sequencing projects to date (Craig Venter's *Global Ocean Survey* [GOS] project for example) "have identified a wealth of genetic richness". We can only agree with Trudy Wassenaar's observation that "pure cultures are a rarity in Nature, and



Slavko Kacunko, a table with methodological convergences related to the interdisciplinary bacteria research.

mixed cultures are the norm."[62] When Thomas Bjarnsholt also writes about the "pure culture period" in the past tense[63], we can recognize convergences with media and cultural studies with reference to Yvonne Spielmann, Irmela Schneider and the discussion about "hybrid cultures" from 1990s on.

Our approach manifests yet another convergence: that of inherited (genetic) and in-habituated or learned, (environmental) interest. The innovative nature of the envisioned collaboration between Health Sciences and Humanities thus also involves the search for shared hypotheses. Regarding bacteria, the "eco-evo" perspective on pathogen-host interactions emphasizes the influences of ecology and the environment on pathogen evolution. For example, we can immerse into the global history, genealogy and transformation of *Yersinia pestis*, a bacterium that is responsible for the Black Death or plague, as well as other pathogens and their impact on our history and culture.[64] Already Publius Ovidius Naso related to the phenomenon as he nominated in his Metamorphoses "Aesculapius, the god," [that] saves Rome from plague". (Bk XV:622–745) What we understand under the resource-materialistic and micro-humanistic approach also includes a methodological reconsideration of the alleged 'overcoming' of the materialism-idealism impasse qua phenomenology or (bio-)semiotic. What occupies our interest in the first place is the question of how to avoid further complication through concretization and

MODEL MODES OF HERITAGE-BIOREMEDIATION

STONE

Physico-chemical methods	Biological methods	
	Bacteria	
Actions	**Agents**	Enzymes
BIOREMOVAL OF UNWANTED ORGANIC SUBSTANCES	*Pseudomonas stutzeri*	Saliva (mucin) →
BIOREMOVAL OF SULPHATES AND NITRATES	*Desulfovibrio desfuricans* *Pseudomonas stutzeri*	
BIOREMOVAL OF CALCIUM OXALATE PATINAS		
BIOCALCIFICATION FOR THE CONSOLIDATION OF STONE	*Bacillus cereus* *Myxococcus xantus* (and other heterophobic bacteria)	

Advantage Bacteria

- only a minority of known microorganisms are deteriorating pathogens (cf. human health)
- ability to synthesize the enzymes required for the degradation of the material, reacting *intelligently* (through mechanisms of genetic induction)
- role in the precipitation of $CaCO_3$ (calcite), which creates a protective layer: reducing the superficial porosity of the stone

Slavko Kacunko, a table with model modes of heritage remediation (bio-remediation).

careful choices of models and motives applicable for what we wish to call an integrated health and heritage research.

A first step is to involve a range of carefully chosen model sites, which, by her first attempted Big Bacteria-labelled project, Sabine Kacunko did consequently with the Colosseum and its paradigmatic importance for a wide range of studies. The latter include, among other possibilities, the study of its 'model plants', followed by its 'model micro-organisms' (building biofilms in the rhizosphere of the plants catalogued there) and Colosseum's 'model material' (travertine) as well as the wider complex that can be dubbed as 'model modes or methods of biodeterioration and its bioremediation'. I shall briefly specify the methodology of modelling already mentioned, and the case of the choices of correlated model entities. It seems more than advisable to conduct an exemplary study using the Colosseum as the world's largest urban plant microcosm being such a unique archaeological site at the same time, containing the longest records of plant and natural biofilm growth and development.[65] The natural patina formed on an object and the resultant biofilm is an ideal breeding ground for evolving plant species. We rely here of course on the work of experts primarily from Italy, including the mapping projects of the plant-biotope of the Colosseum and the more recent general inquiries on *Plant Biology for Cultural Heritage* of Prof. Giulia Caneva and other colleagues. Looking for reliable research specimens, it seems sound to begin with model plant-organisms and to relate them to assumed health and cultural codes. At an early stage, one may opt for a fairly conservative pattern: from about 600 registered plant species in total we first picked the examples that are documented in the entire 6 mapping projects from the seventeenth century to 2001 and that also appear on all 5 levels of the building. Within this framework, very few candidates for model plants remain, but those that do offer further interesting hypotheses relevant both to human health and heritage-'health'.[66] In *Capparis spinosa*, for example, various flavonoids were identified. Capers contain for example more quercetin per weight than any other plant. Quercetin is an anti-oxidant substance which can forestall allergic and inflammatory reactions. It may contribute to cancer prevention and the authors of the Classical world, from Theoprastus (371 – c. 287 BCE) to Pliny the Elder (23 BC– August 25, CE 79)[67] and Athenaeus of Naucratis (died 192 CE)[68] wrote extensively about the medicinal properties of capers.

The step from plant biology related to cultural heritage to our interest in *bacteriology from the health and heritage* points of view leads to a better understanding of microbial ecology including what Th. Bjarnsholt calls 'sociomicrobiology'[69] and other interdisciplinary aspects.[70] An envisioned anal-

Capparis spinosa from Colosseum. Drawing by Richard Deakin, 1855.

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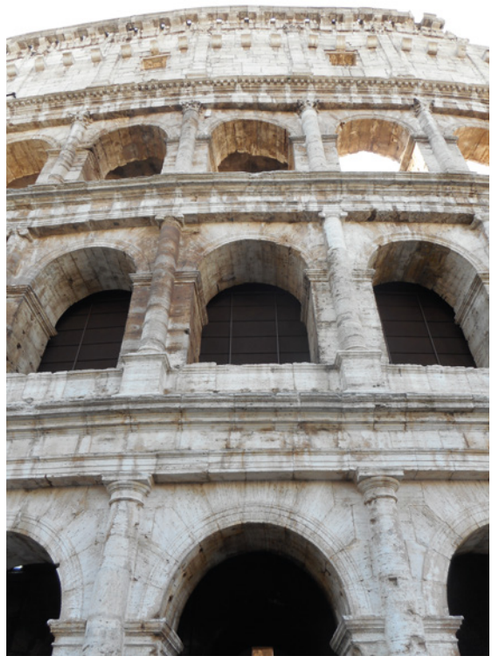

Colosseum – a view on its newly cleaned travertine façade (NW). 3.3.2015.

Colosseum – NW side, seen from the inside. 3.3.2015.

ysis of both chosen actual and archived examples of natural biofilm and the health plants in Coliseum might rely both on works and expertise on site and in other well equipped centres. Prof. Thomas Bjarnsholt and the team affiliated to the Copenhagen Biofilm Test Facility would be suited to undertaking such a comparative investigation of the bacterial microbiota in human health and disease compared to the environmental ones, using advanced light and electron microscopy as well as diverse tracking and analysis techniques.[71] This leads us in turn to the microbiology proper[72]: In her general inquiry about plant biology for cultural heritage, Giulia Caneva and colleagues were quoting several times results of Prof. Krumbein's research conducted together with wife spouse Prof. Ana Gorbushina from BAM (cf. Section 3) on biodeterioration. Sabine Kacunko and I have published by an occasion some results on Sabine's work on Alexander von Humboldt and the biofilm included in his Sahara-dust in Christian Ehrenberg collection in Berlin together with Ana Gorbushina. I am mentioning it to illustrate the converging interests throughout the different disciplines, backgrounds and mentalities, that seem best suited to meet within mentioned 'model' cases and projects, which, again itself must be recognized a constituent part of the artistic work of Sabine Kacunko.[73] The general recognition of bacteria as "models for study of humans"[74] becomes more concrete in the natural and cultural health and heritage context where knowledge about the bioremediation function of

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different bacteria species and their application in concrete cases of biodeterioration is still in its infancy.[75] The number of not-yet described interactions between the microbial species and the different materials is, with exception of stone, still considerable. The process of 'biocleaning' and the advanced biotechnologies based on the usage of micro-organisms to remove patinas rich in sulphates and nitrates is therefore an interesting application field of research which obviously need to be carried out at the artistic, 'micro-humanistic' and scientific level. One of the bacteria specimens discovered on a first trial check of a sample from a capital at the Colosseum displayed a range of quite 'common' Gram-negative bacteria, among them *Bacillus cereus* which is already known for its property of consolidation of related stone, while being toxic in human food. What we learn by opening a perspective of microbial mapping of such 'common' (and still – seen as a whole – quasi endemic) urban biotopes is not only to include and optimize the applying of live biological cultures onto monuments with purpose of their bioremediation, but also to understand both monument's – and human health's – self-bioremediation and what we metaphorically use to call 'growth'.

MATERIAL MATTERS

This leads us to the chemical and physical layers of an interdisciplinary inquiry that must acknowledge the close relationship between the inorganic substrates and the bacteria that influence or even produce the dynamic behaviour of these substrates. One method which bears potential for parallel consideration between the health and heritage applications is the biocalcification for the consolidation of stone, especially of highly calcareous stone like travertine, which forms the supporting substrate of the Colosseum.[76] The travertine of the Colosseum supplies the best and most famous case history of reducing the superficial porosity of the stone. Extensive deposits over ninety meters thick exist and have been quarried for over two thousand years at Bagni di Tivoli (the Latin Tibur), twenty kilometres east of Rome. Quarrying began from the time the conqueror of Jerusalem and the founder of the Flavian Dynasty, Vespasian, built a road to Rome to transport Tivoli stone or *lapis tiburtinus* – travertine – to Nero's gigantic fish-pond at his Domus Aurea and in its place, built the Colosseum. The work took place as we know until 80 CE, but has, in fact, continued until today. As equally well known, Colosseum was then inaugurated by emperor Titus, just few months after the death of his father Vespasian and Vespasian's friend Pliny the Elder. Pliny again begins his last and only preserved work *Naturalis Historiae* with a long dedication to Titus-Vespasian, not without self-conscious underlining the novelty of his treatise on Natural History in the history of Roman literature. Its novelty lies, as noted by innumerable researchers on this author, not only in its prefiguring of the later Encyclopedias: Its 37 books are organized also in a specific 'dramaturgy' that leads from the 'macro-sphere' with in part remote subject matters like astronomy, meteorology or geogra-

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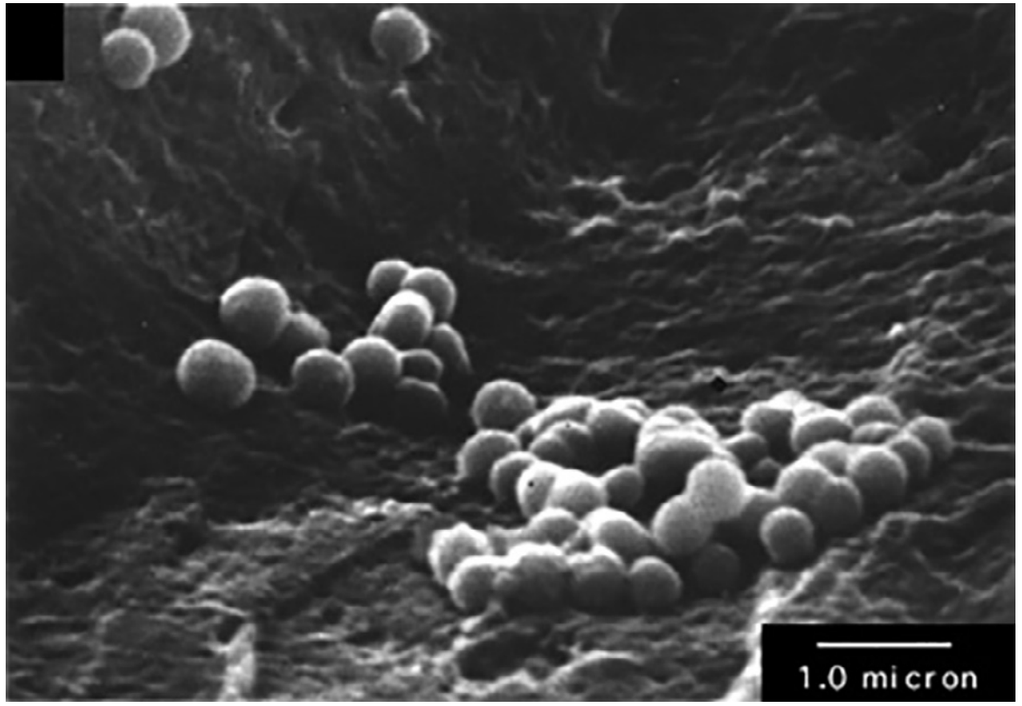
phy over to the 'meso-sphere' including the immediate human-realm with ethnography, anthropology, human physiology, zoology, botany, agriculture, horticulture, and pharmacology. Finally and not least, the last four books immerse into the often hidden, but through the products of human culture, ultimately manifest 'micro-sphere' and its material base, as revealed through mining and mineralogy, especially as applied to life and art, work in gold and silver, bronze statuary, painting, modelling, marble sculpture, and precious stones as well as the invention of the amphitheatre. As such, it is important to note that in Pliny's *Naturalis Historiae* neither the division between natural and cultural studies exist, nor that between visual and material culture (I will return to this in the Section 5). However, these two divisions became at a not yet precisely defined point in time the prism through which the assumptions of the future has become to be projected backwards onto the facts of the matter.

After the early work (1744) related to Roman churches and *spolia* by Giovanni Marangoni (1673–1753)[77], Rodolfo Lanciani (1845–1929) gained the title as an undisputed authority in Roman archaeology and topography while significantly beginning his classic work on destruction and ruins of Rome (1897), expressing astonishment at the apparently traceless removal and 'disappearance' of a 'mountain of masonry' from ancient Rome (cf. Section 1). There almost directly follows a quote from Pliny, suggesting that "in a certain sense we may say that the history of the destruction of Rome begins with the reign of Augustus, who undertook to transform the capital of the Empire from a city of brick into a city of marble."[78] From Pliny's own time on, however, it should be added that the city of marble has been transformed into the city of travertine. We know that the conquest, destruction and sacking of Jerusalem by Vespasian and Titus were the financial foundation stone for the Colosseum. The stripping of travertine from the Colosseum created the city of Rome as it was been remodelled throughout the 15th–18th centuries and today, including the most iconic monuments that stand for European culture and civilization, and our diverging ideas of it. It seems clear that the subsequent search for the visual and ideological parallels with either Augustus' and Vitruvian idealism, formalism and conservatism on one hand, or Flavian materialism, media spectacle and populism on the other, still forms our understanding of 'ourselves'. What specifically interests us here is Lanciani's beneficial interest in the processes that brought about the metamorphoses of matter, which brought him – after a long century of historicism and nationalism – back to the approach of Pliny the Elder and his purpose to cover all learning and art *so far as they are connected with nature or draw their materials from nature*. The quarrying and transformation of the travertine to and from Colosseum is confirmed by Lanciani in often dramatic generalizations that serve well to imagine the amount of energy involved in this material over the two millennia. There was hardly an edifice in Rome dating from the fifteenth century the erection of which did not simultaneously carried on with the destruction of some ancient structure; as a matter of fact, Lanciani highlights that there was no great ruin of marble or stone that did not have

Villa Adriana in Tivoli: Lichens as deteriorating / staining agents. February 2015.

its own kiln. The industry of lime-burning at the Circus Flaminius gave so the name to the whole district Lime-pit (*calcarario calcararid*).[79] How huge the identification potential of lime burning and 'culture' still is, also emerge in the most recent research (2015) results on the other side of the continent, bringing the first evidence of lime burning in southern Scandinavia – lime kilns found at the royal residence on the west bank of Lake Tissø.[80] Lime kilns, with their purpose of producing quicklime by heating the CaCO3 to about 1,000ºC in order to split it into CaO and CO2, can be understood as another, material side of the coin which brought about the Roman Architectural Revolution (also known as the Concrete Revolution) with its widespread use of the arch, vault, and dome. What is the resource-material basis of Rome's so-called Concrete Revolution? There are obviously convincing arguments to include sociological and cultural aspects, but the debates and polemics between economic (Marx) and cultural (Weber, Bourdieu etc.) analysis cannot be included in these retrospective-prospective reflections.[81] However, we must insist – and therefore follow Pliny the Elder – on some resource-material preconditions of at least geological and meteorological nature to support the otherwise threatening oversimplification and loosing reflectivity of our art- and cultural analysis.

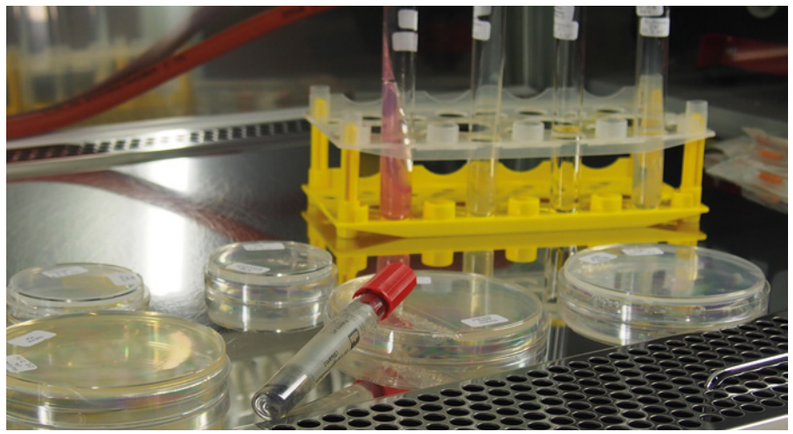
A comparative example may suffice as illustration for the approach. When we look at the production and manufacturing of glass as well as to its cultural impact, we cannot just mention the 'rise of the Venetian Republic', but we need to look at the material and other preconditions on site as well. Like the manufacturing process and its usage and distribution, the consistency of glass is far from simple. Although glass is rigid and stable, the distribution of molecules in its inner structure follows the disordered, apparently random principle of liquids. It was not until the 1930s that the refraction of X-rays by simple glass revealed this general disorder. Molten glass contains silicon and oxygen atoms, all of which are so loosely distributed that the glass appears transparent. This disorder appears during the melting process and before the atoms unite to the parent molecular patterns again during the cooling, all movement ceases in a 'frozen' state of apparent 'molecular chaos'.[82] It is this molecular structural looseness that gives glass its enormous malleability and flexibility. But the molecular structure of glass is still a huge scientific challenge. It seems that the glass industry has supplied the greatest impetus for glass research over the past 600 years. Its paradoxical nature as a 'solid liquid' arises from the absence of a clearly identifiable crystalline structure, while keeping its unique fragility, which no other solid material has. The 'molecular chaos' of glass has its limits at the subatomic level, however in a not yet 'decoded' form. Experiments with X-rays have revealed certain neutron scattering patterns on glass, but its structure is still a matter requiring basic research, since as Dr. Peter Krause of the research department of the Schott glassworks in Mainz concludes, "with all the molecules and all the possibilities of their movement and interconnection and so on, even the largest computers are too small for the study of the structure of the glass [...] we do not do such studies here, although it is a good field for the universities."[83] Certainly, but when we look at the rhetoric of the recent commercial for Schott glassworks, we learn from the slogan that glass is made of ideas ("Schott – glass made of ideas"); it is about "rethinking glass"[84], and yes – reversibility and malleability of matter as such implying its infinite metamorphosis through the advantage of the industrial modes of production. This was like the case of the melting down of the travertine from Colosseum to build the next representations of Roman culture and civilization. But if all this "is a good field for the universities", we believe that the skills should be shared between the sciences, humanities and the arts. Mirror glass – the 'booster' for Venice (and later European) economy – is made, apart of ideas, of 70% sand (silica), 12% soda (sodium carbonate) and 13% lime (calcium carbonate, CaCo3) and Venice would have never become what it became if the wonderfully adequate sand in its lagunas had not provided offered the best resource preconditions. The same applies to the Roman Concrete Revolution, travertine and its quarries in Tivoli that made Colosseum and the subsequent developments possible.



Small, nanometer-scale spheroidal and ovoid features were first discovered in carbonate minerals forming in hot springs. Robert Folk claims these structures are made by nannobacterial biomineralization. Photo courtesy of R. Folk´s Nannobacteria Photo Gallery.

BIOREMEDIATION

In art history and archaeology, our colleagues starting with Georg Dehio and Alois Riegl have focused on this material aesthetics full of theoretical, institutional, political consequences, writing of the *"schicksalhafte Bindung des Denkmals an die Einmaligkeit seiner Materie."*[85] Our own take on the matter focuses less on the cultural drama than on the sober facts of travertine as a sedimentary (evaporitic) chemical rock formed by a process of rapid precipitation of calcium carbonate ($CaCO_3$).[86] Sober as this point of departure may be, the deeper interest in the geochemistry of travertine rewards us with recognition of the three factors or forms of deterioration, i.e. patinas (which are essentially regarded as biofilms), stains and pitting. We believe that it makes sense to deepen their systematic study, while extending that perception in parallel to both human health and our natural-cultural heritage.[87] This is why the modes of heritage biodeterioration and bioremediation belong to our research interests in this context, while the recognition of the material and functional parallels to the human body brings the benefits of an integrative health and heritage approach; while recognizing another sober fact that calcium is the most common mineral in the human body as well.



Top: Sabine Kacunko, taking a sample from Colosseum's surface. July 2015.
Middle: Samples from the Colosseum surface
Bottom: Sabine Kacunko, Maria Laura Santarelli and Cinzia Conti during a collecting of the micro samples from Colosseum´s surface. July 2015.

The best known and most widely studied type of damage in – let's call it 'calcareous environment' – is acidolysis (lytic action of acids), since calcite, like most carbonates, dissolve with most forms of acid. The biodeterioration in case of travertine can be 'read' from the reaction between $CaCO_3$ and the H_2SO_4 (sulphuric acid) produced by sulphur-oxidizing bacteria, resulting with the equation $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2CO_3$. The displayed figure shows an example of staining as – an initial stage of the "savaging" of the stone at the Villa Adriana in Tivoli through diffusion of lichens on stone. Here, photosynthesizing pigments like carotenoids (carotene, xanthophyll etc.), which are mostly yellow are at work. They are related to flavonoids (like the above mentioned quercetin in capers). These yellow substances develop as a result of bacterial co-production (and sulphur- and iron-staining), responsible for the ground-colour of most travertines as well. Similarly and directly related to the pitting of stone, lithotrope, that is, stone-eating, bacteria belong to the main deteriorants. Endolitic (inside the stone living) Cyanobacteria[88] and algae belong to these substrate-pitting species.

The similar mechanisms are on work when we are looking in 'reverse gear' for the model modes of bioremediation of the biodeteriorated substrates. Bioremediation of such surfaces and deeper layers of substrate including stone and soil is often carried out by using sulphur-reducing and nitrate-reducing bacteria[89], as in the case of applying a strong denitrifier like *Pseudomonas stutzeri* applied directly on fresco.[90] However, the tests with *Desulfovibrio desulfuricans* or *Pseudomonas stutzeri* (the latter high capacity for denitrification) also require long-term approval and application periods – and therefore money – which again can only be secured by joint actions and networks like the Big Bacteria initiative. Although the related research in Italy is institutionally widespread due to the world's highest density of cultural heritage, it remains the financial and time-problem that urges for more international and cross-disciplinary action.

Finally, we recall that the material we're talking about when referring to travertine includes, as mentioned, the most common mineral in the human body – the calcium needed for healthy teeth, bones and other body tissues; the benefit from an integrative health and heritage approach which we advocate is obvious. This leads us to continue to trace back the chemical and physical layers into our interdisciplinary inquiry related to the interrelations between the inorganic substrates and the bacteria. One of the bacteria species that Thomas Bjarnsholt and his team discovered on Sabine Kacunko's first trial check of a sample taken by the *Sapienza* team of Prof. Maria Laura Santarelli from a capital in Colosseum have shown a variety of quite 'common' Gram-negative bacteria, among them the above mentioned *Bacillus cereus*[91], known for its property of consolidation of related stone. At the same time, *B. cereus* is toxic in relation to human food which especially appears in rice.

A rather mysterious example of nanobes or nan(n)obacteria, as they are called, may merge fact and fiction, science and art a little more than we would prefer, but it may serve equally well at least for our purpose of intensifying the debate. I refer here to Robert Luigi Folk, a sedimentary geologist from Austin,

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Texas (Emeritus of the Department of Geological Sciences), who back in the late 1970s presumed the presence of spherical structures in an assortment of geologic materials. Early SEM (Scan Electron Microscopy) methods revealed nanobe structures 0.05–0.2 μm within organisms as well as rocks, i.e. only up to 1/5 of the 'average' size of the most known bacteria species. Nanobacteria, allegedly found in human blood, may be related to health issues such as the formation of kidney stones or arterial plaque due to their biomineralization processes[92]: Calcification can be therefore regarded as an agent of biodeterioration and bioremediation at the same time. Folk made his first discoveries during field research on travertine in Viterbo and Tivoli. The fact that biofilm, stains and pitting occur in both the 'skin' and 'substrate' of heritage and homo sapiens alike points to the permanent exposure of both to a myriad of bacteria. We must not forget that these 'colonists' are not only 'infections' or 'pathogenic' by nature, but in most cases either transient or simply resident.[93] The foundations of studies in the humanities, not least of 'post-colonial studies', may profit substantially from such a micro-humanities approach.

One long-term goal of the *Invincible* project, which starts with the public art installation and performance at the Colosseum, is its continuation through a subsequent cooperation of the artist with scientists and institutions from Italy, Germany, Denmark and other centres, in order to increase public outreach of knowledge and sensitivity of the society to the obvious, but hardly visible transformations which affect public health, natural and cultural heritage. In 2014, Sabine Kacunko approached me and the colleagues from Rome, Copenhagen, Berlin and Aalborg with a rough proposal for a Big Bacteria network by putting together a wide range of her own artistic work on the one hand and our own respective basics in other fields of research in Sciences and Humanities on the other. This is not the place to tackle the often unfruitful Art-Technology discussions, with their tendency to 'release and rescue' rhetoric. Instead, I wish to keep our discussion focused on both the 'lower' and 'higher' layers' of the matter and attach it, again, to what has been named the 'materialist turn', irrespective of the fact that we are not reluctant to the views that emphasize continuity, process and transformation. Recent conferences and calls like *Image Matter: Art and Materiality* (Manchester Metropolitan University, 6 November 2015) or *Art Matters* (Barcelona University 2014) and *Art and Materiality* – section of the *Artnodes* Journal 2015 require an examination of the alleged change in the underlying perspectives that tackle the current philosophical and political state of the art.

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Section V
Death and its Healing

Everything changes, nothing dies: the spirit wanders,
arriving here or there, and occupying whatever body it
pleases, passing from a wild beast into a human being,
from our body into a beast, but is never destroyed.
As pliable wax, stamped with new designs, is no longer
what it was; does not keep the same form;
but is still one and the same.

Publius Ovidius Naso, *The Metamorphoses*, Bk XV:143–175 Pythagoras' Teachings: Metempsychosis

Nothing keeps its own form, and Nature, the renewer
of things, refreshes one shape from another. Believe
me, nothing dies in the universe as a whole, but it varies and changes its aspect, and what we call 'being
born' is a beginning to be, of something other, than
what was before, and 'dying' is, likewise, ending a former state. Though, 'that' perhaps is transferred here,
and 'this', there, the total sum is constant.

Publius Ovidius Naso, *The Metamorphoses*, Bk XV:237–258 Pythagoras'Teachings: The Elements

In providing methodological bridges and model cases between Art and Science, our joint ambition is not just to advance our own, 'transitory' approach, which I previously called 'Micro-Humanities.' Its minimal goal is to supplement the visual culture approach with the one based on material culture. Since the cell as *res vivens*[94] (mediating between the dichotomies based on *res cogitans* and *res extensa*) exhibits a form of organization that is responsible for interpreting and changing the processes in which it is involved, bacteria serve as central models for individuation, agency and selfhood, observing- and interpreting systems. Historiography and experimental and medical praxis, art and literature provide best documented field (if barely interpreted in-depth), on which the centuries of bacteria-based epidemic twists must be projected. As their taxonomy unambiguously suggests, bacteria are the facts of the permanently changing and sensing living matter. Microbial 'dust' and 'patina' theoretically framed as material and medium, represent an important case of bacteria's agency to be systematized and related to the research on bioremediation and biodeterioriation. This is why we advocate an overcoming of the reductionism implied in the identity-oriented use of culture as capital or nature as a resource. The latter 'capitalist idealism' is losing ground to the narrative of the mediating 'micro-humanistic' and 'resource-materialistic' approach,

a narrative that goes from Closed Circuit to Big Bacteria, and from 'live' to 'life'. While we don't recognize the benefits of the idiosyncratic animosity of cultural studies against sciences, we certainly don't see the respective inclination towards death, decease, decadence, disasters, catastrophes, cynicism and (cultural) idiosyncrasies as métiers of Culture with a capital 'C' on the one hand, and the focus on life, health and management of our shared cultural and natural resources, of culture-independent studies as métiers of Science with a capital 'S', on the other. This is why a mediating perspective of 'Micro-Humanities' needs to position itself towards the two mentioned leading concepts.

LIFE AND ITS CONSTRAINTS

The question about 'life' under the conditions of its decay and simultaneous mechanic-chemical reproduction is posed in the context of the complete oeuvre of Sabine Kacunko both from the artistic and the scientific perspective. We know the aspects of the molecular mechanics, the circuit of metabolism and the genetic network as well as the aspects of the biosynthesis of the membrane, but we still do not know what makes the living cell naturally alive (Kauffman 2002, p. 126). A significant contribution to this 'life question' comes from the biochemist and physicist, astronomer and philosopher, doctor and system theorist, Stuart Kauffman. In his work with models in the various areas of biology, especially in developmental and evolutionary biology, he points out that the understanding of the fundamentals of 'life' for biology would mean the establishment of a so-called 'general biology'. This general biology would have to act free from the restraints of a terrestrial biology, which is the only one that we have known so far, in order to be able to ask the questions about the laws of the biosphere in the entire universe (cf. Kauffman 2004 & Atkins 2002). Thus the 'Gaia' hypothesis today is experiencing not only its actualisation accepted in expert circles, but also its expansion. For the topic analysed here by Sabine Kacunko in her numerous media performances, it is important for the perspective expansion in Kauffman's theory to occur only through a criticism of the reductionist scientific model. With her project *SAY(IL)ING* [*BO(O)TSCHAFT*] she has not only distanced herself from the rhetoric of artificial life and artificial intelligence art and research, but she has also applied the means and methods of molecular biology, geology and other branches of the natural sciences in order to continue the on-going disputes between the 'macro narratives' and 'micro narratives'. The key question of the book *What is life* (1944) by Erwin Schrödinger (Schrödinger 1951) referred to the source of the astonishing order in the 'biological system'. The answer was not a reply to the question, according to Kauffman, that was asked in Schrödinger's book title. To put it simply, he 'shortened' his question about 'life' that led him to the assumption that the order of the living requires some stability of chemical bonds. He assumed this stability – unlike his first correct assumption – in the aperiodic crystals, whose structure would have to include a microcode of

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the animate organism. About a decade later, James D. Watson and Francis Crick did in fact discover the molecular structure of the aperiodic consistency of the desoxyribonucleic acid (DNA), whose microcode, in the sense of the genetic code itself, was to be understood another decade later. However, unlike the co-founder of the quantum theory and the 'philosophic physicist' Schrödinger, Kauffman did not pose the question on what the source of the biological order is, but: *"what must a physical system be in order to be an autonomous agent?"* Kauffman's 'tentative' answer was: *"An autonomous agent must be in the position to reproduce itself (1) and to accomplish at least one thermodynamic operating cycle (2)."* (Kauffman 2002, p.128f.) Kauffman takes a bacterium in a glucose solution as an example. The bacteria 'love' sugar, as many of us know, and by swimming in such an environment, they fulfil the operating cycle of life apart of their ability to reproduce themselves asexually through splitting. Subsequently, Kauffman not only admits that his 'tentative' definition of the 'autonomous agent' (≡ the 'animate') remains circular, but he also demonstrates that this particular 'provisional' character of the definition *in this case* shows the essence in this definiendum. At this point there is no need to quote the concrete chemical systems described by Kauffman; (130–1) the characteristics of his 'provisional' 'autonomous agent', which can be derived from the definition, are important. The system 'works' only *outside* the chemical balance, i.e. the 'autonomous agent' depends on an asymmetry, that is, an imbalance. As such the 'autonomous agent' creates a new class of 'networks with systemic unbalancing' with an innate self-reproduction and the operating cycles. The concept 'work' (occasionally used metaphorically as 'play', but, of course, in the 'case of life' it is irrelevant what term is used here as a metaphor for another one) remains meanwhile problematic, because it stays – first – open, from which the impulse for 'work' comes and – second – 'work' cannot be done in isolation. The universe must be divided into at least two parts ('material' and 'environment'). This division into 'material' and 'environment' means thus: a limitation, a constraint, but also a rule or a law. But where do these come from, without having already done the 'work' of their becoming? This question shows that – when applied to 'life' – they produce a vicious circle. Schrödinger's question about the 'source of the biological order' or 'life' could, according to Kauffman, do nothing better than generate an 'information-technical' or 'informatic' concept with the assumption of 'stored information' in the microcode of an aperiodic crystal. The specific arrangement of constraints responsible for the release of energy, this 'stored information' can be used to produce new energy that can be used for the new 'work', which again creates new constraints etc. Although a dividing bacterium does precisely this, we do not even have a draft for an adequate theory to explain the organisation of the process of energy release and its influence (the philosophers would call it 'causality').[95]

So the legitimacy of the theoretical fundamentals of the arranged marriage between information technology and molecular biology would have to be examined. It is thus no surprise when Kauffman describes, in the same breath, the dispersion pattern of microscopic monads and their macroscopic coun-

terparts of the biosphere – the endangered rain forests. From this, and again using the example of the "*obscure molecular mutation in the bacterium*", Kauffman derives his most famous thesis: that the self-organisation in the creation of the complexity of organisms and biological systems is a factor as important as Darwinian selection.[96] The unpredictability reinforced with it – the deadly sin of computing – could be also conceived as a chance, as Kauffman writes in the conclusion: "*Life is inherently open, and its understanding will require raising physics and chemistry to new levels, wherein the future is open rather than predictable in pre-stated categories*." (Kauffman 2002, p. 140).

CHOOSE LIFE

It may be God, the Big Bang, or a Coreless Cell: any and all equivalences, dualities and dichotomies essential for logic, mathematics, physics, astronomy, chemistry, biology, religion, humanities and social sciences are conceived as emerging out of a single dividing gesture. It brought about mass and energy, time and space, light and darkness, left and right, life and death, mind and matter, female and male, and everything else. The gesture itself has been imagined and filled up with sense and meaning since the dawn of magical, religious and philosophical thought. The painful gesture was occasionally reduced to the univocal collapse of being, meaning and thinking as proposed by Apeiron- and emanation theorists, monists, monadologists, and contemporary irrationalists. Dissolved in pure and emergent moments of non-discursive, non-dialectic modes of difference and repetition, the rejected coreless identity has been bereft of its sense- and meaningless life to breathe new life into the modern and contemporary thanato-philosophies. An absolute positivity set on top of the negativity, an absolute singularization and immanence addressed either by Gilles Deleuze or by Uncle Sam: It is a sacrifice and subjugation of the alien-gladiator to a master concept irrespective of the mode of the transported message in a post-Flavian, preferably populistic *theatrum sacrum* or *theatrum profanum*. The receiver of the message is invariably that same society-less 'You'-singularity known from Olafur Eliasson's art installation titles from the 1990s, back to Henry David Thoreau's mid-19th Century request to "let your life be a counter friction to stop the machine."[97] It is no surprise that the corresponding neo-transcendentalist lines of thought and action enjoy great prestige today, at a time when the instrumental reason has reached and maybe passed its peak. Bruno Latour, for his part, observed that the keener the romantics, spiritualists and anti-reductionists want to save the subjects, the stronger the attempts of the materialists, scientists and reductionists to bring objects into their possession. Not least of all, the so-called 'semiotic turns' are the target of Latour's criticism, since they seem to function – as a special form of reductionism – as intermediaries only independent from the nature of society. This autonomisation of the sphere of significance and meaning has led to an impasse because the semioticians have limited their affairs entirely to the discourse, text and language games.[98]

We might pose the question whether the hybrid (though by far not unifying) views like that of bio-semiotic might cross this impasse; if the cell, by performing its task of the embryonic reading of the chromosome, is understood as "the simplest natural case of an observing system" (Pattee 1996), then also the vitalistic concept of an observer on the one hand and the calculation concept of measurement on the other, seem – at least from a bio-semiotic lookout – to converge in the concept of the interpreter. The moral-practical and theoretical spheres meet and merge asymptotically in the aesthetic sphere in the same matter in which the vitalistic sphere of the Logos and the emergence-sphere of Bios meet in what Hoffmeyer calls the "Semiosphere" – the sphere in which an emergentist view of life is not yet given up by introducing the concept of the semiotic emergence. However, I suspect that this path of alleviated reductionism was not quick to replay the critical questions posed by Kauffman and others. Latour's attempt of reconciliation of 'Nature' and 'Society' through 'Collective' in which the 'quasi-objects' and 'quasi-subjects' coexist inseparable from each other touches, like many other post-human philosophies both from the Anglo-Saxon (Latour, Haraway, Hayles) and European context (cultural techniques-theories from the German speaking realm), are not much more than the surface in the name of the allegedly defence of marginality; the bacteria are rather 'seen' as an extreme case that confirms the rule, instead of being themselves the ruling power of human, animal, and plant micro-biome, embedding themselves (as demonstrated in the previous Section 4) straight into the 'inorganic' material substrates and making the latter to a special effect of its permanent and permeable processes. There is certainly some risk of "reify the potentialities" when we attempt to reduce the methods of humanities to those of science, as Massimo de Carolis highlights in his Latour-critical book *La vita nell'epoca della sua riproducibilità tecnica*[99] and it certainly applies to the growing number of the post-Duchampian art projects previously associated to the bio-art label, but perhaps even better fitting to the label *Bio-Dada* or *Neo-Alchemy*, when projects come to mind, by which bacteria are engaged to produce shit or gold, or the latter from the former. However, De Carolis underlines (together with Krumbein, Hoffmeyer, Caneva and many others in the meantime) the central part of bacteria in the realization of a potentiality in which the environment must be conceived as much more than a passive energy reserve or 'resource'. He also uses the example of bacteria that have the ability to feed themselves due to a specific enzyme of lactose, while the enzyme can be synthesized only in a lactose-rich environment. Some desert plants, for example, contain seeds that remain inactive for years until the randomly rain falls down which initiates the development of the embryo.[100] We are dealing with random processes, which are not connected with choice or free will. How, though, might they – and the whole range of the bacteria issues mentioned – be projected onto human beings, onto a sphere in which ethical issues are mixed with the economy and acculturation of propagation and growth?

The question posed in the last passage is related to the issues of 'life' and 'death' discussed above, addressing the relation in which the ominous

substantive 'choice' – an iconic 'thumb up- or down' from the context of both *munera* and Facebook – may stand to the processes that we tend to call 'art' and 'life'. The imperative form 'choose' should, however, not suggest a categorical imperative as known from different contexts, but the possibility of a hypothetical imperative, which compels actions only in given circumstances, for instance: "if I wish to acquire knowledge, I must learn"... But when we relate a hypothetical imperative to Life, it obviously becomes a highly problematic ethical issue, as if we were in a position *not* to choose it. So the question remains: where to start if there is no choice? Obviously, we might start with the world of ethical monism of Spinoza, in which there is no choice offered at all in a determinism that leaves just one determination open – life according to mathematical principles. Descartes should be added here with his dualism of cognition and Leibniz with his windows of perception. These three huge philosophical systems of the 17th century are already marking the end of the big systems, while opening the way to systematic thought and reflection about the systems 'as such' as well. An example:

Many of them who watched the iconic Scottish film *Trainspotting* of 1996 will remember that it was not only the movie, but also the visual design of its highly suggestive poster, that attracted attention at that time. Its visual message was however made of the verbal messages and – seen in light of our previous question – it reveals our hypothetical imperative in its context as a *hyper-sarcasm.* The process of its merchandising and transformation also became its cultural, subcultural and media dynamics. The freedom of choice promised by chemical-based or also electronically-based technology is reflected there as what it is – a freedom to choose between a limited number of predetermined alternatives (So our "Choose Life"-poster went down to the products like the tatoo-templates, Coffee-cups and – the best of all – the Choose-Life-vallet: an icon of a restricted freedom of the consumer).

1996 again. It was a time, when 'the curatorial Turn', according to Paul O'Neill, came into being. It was a time, however, when not only the curating of Art, but also the curating of Life became a new discipline (through the human genome projects). Both, the economic, cultural, scientific, and media-communication processes and the parallel, enhanced production of outsiders, became no small factor also in the explosion and the following expansion of the art universe. It was a time when the "Young British Artists" popped up from the Goldsmith College and together with the rest of the art world recognized what might be achieved through good merchandising. Its symbol remains the shark by Damien Hirst, accompanied by the highly suggestive title, related again to the our subject, bringing us back to Gilles Deleuze and his meditations on Style. For the French philosopher, Style has not only a syntactical, but also an existential dimension. It creates 'life', in his sense. Style is a mode of living, but it is an immanent, impersonal, singular life that he describes. Deleuze explains that Life is a: '*homo tantum*' (*bare man*), which is no longer an individuation, but a singularization, a life of pure immanence and implicitness.[101] This concept of ("bare") life, which relates to Deleuze's conception of our unlimited, might be called infinite creativity. We

are also certainly familiar with the critics of that concept, like Alain Badiou, who claims that Deleuze does not actually reverse Platonism but presents a Platonism of the virtual (even if 'virtual' and 'intensity' are not seen as equalized). In other words, Deleuze rejects the Hegelian dialectic and the historical perspective in his revaluation of difference-in-itself – itself, again, a contradictio in adjecto...

These previously mentioned and many other impasses of idealism and virtualism in the recent and contemporary thought bring me back to final remarks on the historical perspective. As we have highlighted previously, Pliny the Elder, in his *Naturalis Historiae,* has offered an art and cultural history as a Natural History. From the perspective of the neo-Foucault school, the main goal of the historical perspective and historiography is to expose the supposedly authentic core of myths. In his critique of the histories of Pausanias, Paul Veyne has come to the conclusion that history is a doctrinal science, because he reduced it to etiology. The aim of micro-humanist approach to the Big Bacteria-complex is not, however, to operate against research into Subjectivity and Intersubjectivity, but to keep the view on the Interobjectivity offered by both natural and cultural techniques, which themselves are offered to us on various epistemic levels, as briefly outlined in this essay. From our micro-humanist perspective in the time of the Anthropocene, we are extending our research from the etiology of 'art' onto the etiology of 'life', and thereby also opening the perspective to the birth, life, death, and possible resurrection of Life Sciences within the context of the Micro-Humanities. Another example:

Our capability to isolate, identify and re-combine genes gives us access to the genetic pool of our planet as a primary resource of raw material – a "bare life" if you will, supported by the old and new thanato-theories, where the exploitation of our ecological and human resources is based on the assumption of their infinite availability, as conceived in Latour's techno-science context and the similar ones. What I am trying to indicate here, in the recent and the coming projects, are the characteristics of what might be called infinite(simal) aesthetics, whose 'origin' seems to lie the repetition. The critical reading of Deleuze's post-doctoral piece Difference et Repetition is taken to critically discuss the gap existing between the historically-oriented approaches and their critics. Let us have another look at the previously discussed patina and biofilm, in the context of Sabine Kacunko's artistic projects:

It has become clear, that bacterial products build an important part of what we call, for lack of a better term – a patina. The latter seems to deconstruct the deconstructivistic argument, namely that the Hegelian sublation or *Aufhebung* of the difference between affirmation and negation were contradictory because they are defined as both 'to destroy' and 'to save.' As a matter of fact, every archaeologist and archivist, every historian and curator deals with that kind of apparent 'contradiction' between 'destruction' and 'saving'. The apparent 'contradiction' dissolves on another level again when we turn to the patina. The key words here are – among many others – the discussed biodeterioration, bioremediation and their involvement in cultural heritage protection and conservation: Detailed knowledge of biogenic pati-

na (*biopatina sensu lato*) has led to improvements in restoration treatments through the production of photo-active melanin, needed for the replacement of monument components or for re-building purposes. The dialectics or 'ambivalence' of melanins is therefore highly important to our considerations, as mentioned above in the Section 3. Through their light sensitivity, melanins are performing their role as 'protective', inert or 'stable' radicals and at the same time, the sulphur-containing pheomelanins perform through the influence of light their 'destructive', reactive role as so-called 'free'-radicals. Ergo, again: this is not about an either-or, but an 'and-and' situation.[102] "Sustainism is a new modernism" – we may quote here the two contemporary designers – and culture is rendered unto nature, and vice-versa, and both are historical. In other words, any 'predictive engineering' today dealing with Death and its healing – the same as any other, highly profitable business with death as seen in *Vanitas* and *Memento Mori* – art works from the Dutch Still Life paintings down to Damian Hirst's morbide and still sterile thanato-aesthetics – must face the 'chaos' and the 'methods' of bacteria.

Between the *causa sui* and Creationism on the one hand and the causalism of neo-Darwinism on the other, there are the creative concepts and practices showing what we try to verbalize while "bringing about effects through a process of interpretation" (J. Hoffmeyer) – and remaining aware that semiotic itself remains hopelessly reductionist. In his opus magnum *Homo Sacer* – Sovereign Power and *Bare Life* about the concept of the "bare life" (not very far from the mentioned Deleuzean one), Italian philosopher Giorgio Agamben described an example of a human being who is allowed to be killed by anyone, but who cannot be sacrificed – which made *this* life – a life of a gladiator, alien, or refugee for example – rather worthless, or beyond the sphere of jurisdiction. In our biotechnology age (as J. Rifkin says), the concept of "bare life" seems to represent rather the opposite: we are dealing with a 'life' that can be and is sacrificed at any time at the altar of science. It is exchangeable, for sale, patentable, re-combinable, but that cannot necessarily be killed any more. The increasingly perfected closed-circuit technologies for display, data acquisition and control are providing us with constant images of this and such 'life', while keeping us so effectively removed from it, as if it did not concern us in particular. The 'life' we are talking about both in the context of art of Sabine Kacunko and our own philosophy, is in a way indestructible, but not because it is not a life any more: This is because a life in the age of techno-cultures cannot be exclusively and adequately approached, appreciated, and immersed by the 'cultural techniques' of storage – image, script and number: The fourth cultural technique of transmission – reflectivity – offers us with a required perspective. Within this construction there may even be a place for the notion of Choice, one might say. The Humanities could expose from this perspective their central, multi-directional and mediation role between the fields of religion and natural sciences, between the *credo* and the calculation, between emotional topology and the topos of rational decision-making – where the senses and reflection build the aesthetic-cognitive sphere, understood as a process of Life, as exhibited through the cells.

Expressed with the bacterial metaphor: Instead of being lost as planktonic cells, easy to manage and manipulate in a freak show of bio- engineering, we are turning into a chronically state of survival by connecting into aggregates and biofilms, which are practically indestructible while becoming more resistant and/or tolerant to antibiotics of globalization.

THE PROCESS ART IN THE AGE OF ITS NATURAL REPRODUCIBILITY

By defining and crossing the differences between research through art, research that uses art, and research about art, the art-based and -related research is generally defined as the systematic use of the artistic process as a primary way of understanding and examining experience by researchers, institutions and the 'public'. As such, it delivers insights into a larger epistemological process of artistic – but not only artistic – knowing and inquiry, highly relevant for future education, professional practices, and societies. In the previous Section 4 we aimed to provide a brief overview related to the strands of methodology, where[103] –being situated between Art and the Sciences – art and research admittedly operate between the devil and the deep blue sea. In providing methodological bridges and model cases, the ambition of the Big Bacteria research network is not least of all to advance its own, 'transitory' resort called 'Micro-Humanities.' But the project itself is supposed to go further in a systematic deconstruction of the theoretical anti-realist trend which Quentin Meillassoux termed 'correlationism' and defined as "the idea according to which we only ever have access to the correlation between thinking and being, and never to either term considered apart from the other."[104] In the Brassier analysis, Deleuze's and Latour's post-modern scenario is based on a non-differentiation of the noumenal and phenomenal as well as real and virtual, which results in a similar anti-scientific uninformativeness and arbitrary indisputableness. Latour's 'irreductionism' in particular presents the "urbane face of post-modern irrationalism." (51) By reducing reason to taste, science to force and the scientific knowledge to practical know-how (and art to craft), Latour reduces the explanation with master metaphors like 'actor', 'ally', 'force', 'power', 'strength', 'resistance', 'network'."[105] But this is not where the story ends, this is where it begins. The process art, and especially 'bacteria art' as it is represented by Sabine Kacunko, resists in some of its media- and site (un)specific manifestations to this pressure, while remaining aware that it is not being protected from regulations and incorporations. The creative process remains painfully loaded with claims, conflicts and compromises and therefore 'cleansed' with the Antiseptic of Kantian correlationalism. The genuinely post-modern (if we may permit ourselves such a *contradictio in adjecto*) and cognophobic aspects of Latour's project are his attempts "to liquidate epistemology by dissolving representation" and ultimately "to reassure those who do not really want to know."[106] While the syndrome described might be dubbed as 'capitalist idealism', we wish to pursue a targeted 'resource materialism' closely related to the

above-mentioned, general 'micro-humanistic' approach in which the bacteria are not just 'recognized' as possible agents, 'emancipated' onto the human level, but understood as major material and cognitive resources. The concept of the ambivalence of objects as autonomous and though interconnected entities, as defended by Ray Brassier, applies to, or emerges from, the fact of the co-existence of theplanktonic bacteria and those bacteria aggregated in biofilm. The 'speculative' nature of the realism espoused by Brassier and the number of thinkers of the younger generation[107] is combined with a shared goal that lies in abandoning of the critical, linguistic and, implicitly, I would argue, of iconic and pictorial turns including their immanent anti-realist tendency as well as a preoccupation with death and finitude, aversion to science, and its focus on language, culture, and subjectivity.[108] The cultural relativism and anti-foundationalism stand in line with the above-mentioned correlationalism with all theoretical, practical and, yes, political consequences, preventing us from a deeper understanding of comparative historical and resource-related relations that might also demonstrate an allegedly contra-intuitive assumption that a 'cultural conservatism' may turn out to be a 'left-wing project.'[109] Sabine Kacunko's process art perspective is guided by a profound and continually growing knowledge and curiosity about both the analogous predecessors and successors of the digital realm. By the same token, the questions about the 'digitalibility' of 'image' become obsolete or in best case rhetoric just like the issue of the 'programmability' of 'art'. It was long ago either recognized or *nolens volens* admitted, that the differentiation of 'analogue' and 'digital' with respect to 'old' and 'new' media in arts contains not only "philosophical inconsistencies", but also "because ultimately every continuous, analog process is reducible to the smallest discontinuous parts as a continuous line can be created through discontinuous points."[110] The concept of process art, as Linda Nochlin puts it, departs from "the naïve idea that art is the direct, personal expression of individual emotional experience, a translation of personal life into visual terms. Art is almost never that, great art never is."[111] The concept of process art – and bacteria art is without doubt its invincible agent – consequently departs from 'creativity' and 'subjectivity' both in their anthropo-logical and culture-logical sense. And still, it remains more than a twist in the instrumental reason.

Right: Sabine Kacunko, Poster for the international conference *Bacteria, Art and other Incommodities: Bacteria in Arts, Sciences and Humanities* (15 May 2015), held in cooperation with Goethe-Institut Denmark, IKK (University of Copenhagen) and MICRO HUMAN, Berlin, in Medical Museion, University of Copenhagen. For the theme, the artist took her recent composite photograph *From Dusk till Dust* (2014). In their joint lecture, Slavko and Sabine Kacunko presented the paper, *Big Bacteria for Micro Humans: Bacteria as Archaeological–Ecological Nexus for an Integrative Health & Heritage Research*, in which the potential material and conceptual bridges for the development of integrated health and heritage research were discussed. On the basis of a 'model case study in progress' – the Colosseum project – the potential of emerging research networks to integrate interdisciplinary perspectives between art-based research and research-based art was also discussed.

Endnotes

1 Besides the elements of multimedia performance, sound and dance, the planned web application will trace, for example, the Rome-wide spoliation of the Colosseum throughout the centuries with the in-built travertine stones in Palazzo Barberini, Sant'Agostino, St. Peter's Basilica, Palazzo della Cancelleria, Palazzo Venezia and St. John Lateran, among many other key cultural sites throughout the city.

2 Flemming 1997, unpaginated. I have used several quotes from Flemming and Kösters in this section, including lengthy ones, not least in order to present their early reflections on Sabine Kacunko's photographic work. Since both authors have since died, it has not been possible to incorporate further revisions or corrections. In some cases, I have translated Flemming's passages anew since the existing English translation from the quoted catalogue doesn't seem applicable to me after a new reading. In such cases, I have quoted the original German text as well and included it in these endnotes. Similar interventions have been made in the case of several quotations from Sachsse as well.

3 Flemming 1997.

4 Marcel Odenbach submitted his thesis entitled *Der Körper als Darstellungsmittel visualisierter Denkprozesse* (*The Body as means of representation of visualized thought processes*) for the requirements of an intermediate examination in the winter semester 1975/76 during his studies in Art history, semiotics and architecture at the RWTH in Aachen.

5 This is a matter of recent discussions, on which I cannot comment within the scope of this essay.

6 *„Eine Entscheidung wurde fällig, die in seiner Macht stand, oder auch nicht – jedenfalls war es an ihm, sie herbeizuführen. War er überhaupt vorbereitet auf eine Entscheidung? Er wußte es nicht; und er würde es nie erfahren, wenn er sich nicht darauf einließe.“*

7 Sabine Kacunko's maiden name.

8 Sachsse 1997, unpaginated.

9 Flemming 1997.

10 100 x 100 x 50 cm. Exhibition: Rundgang Kunstakademie Düsseldorf, Class Prof. Callahan.

11 3x 140 cm x 140 x 50 cm. Exhibition 1992 Fotogalerie Fabrik Heeder, Krefeld.

12 210 x 750 cm.

13 Sachsse 1997.

14 Hippolyte Bayard (1801–87, direct-positive-method), Herschel, Steinheil, Kobell.

15 Sachsse 1997.

16 Maillet 2004.

17 First exhibited: 1991Rundgang Kunstakademie Düsseldorf, Class Professor Callahan; 1992 Fotogalerie Fabrik Heeder, Krefeld.

18 *„Diese rätselhafte Atmosphäre des Stillstands, Inbegriff einer beunruhigenden Stockung blockiert ebenso die Erinnerung wie die Antizipation der Zukunft. Denn der Blick wird gefangen von der Fülle des Bildes, die das Auge okkupiert, so wie die Irisblume – um ihre eigene Achse gedreht – uns die Iris des menschlichen Auges enthüllt*." Kösters 1998.

19 *„So wie eine Photographie das Fortleben der körperlichen Erscheinung nach dem Tod verheißt, so nimmt sie dieser Verheißung die Proportion. Zwischen großen Bildern kleiner Gegenstände stehen zu müssen, bereitet wie alle Disproportionen Unbehagen, verhilft aber zu manchen Erkenntnissen*." Sachsse 1997.

20 Flemming 1997.

21 Sachsse 1997.

22 Kösters 1998.

23 Sebastian 1997.

24 Sachsse 1997.

25 Flemming 1997.

26 *„werden jene Intuitionen in Wahrheit weder Intuitionen des Realen noch solche des Irrealen, nicht Wahrnehmungen, sondern reine Intuitionen. Wo alles real ist, ist nichts real* ..."]. Croce 1930. In this mostly neglected main work (it. 1902) in the German-speaking world despite his influence on German art historians at the beginning of the 20th century (e.g. Julius von Schlosser), Benedetto Croce (1866–1952) wrote about the inseparability of intellectual and intuitive insight. The distinction between reality and illusion is foreign to the nature of intuition: this philosophical conclusion by Croce was highly influential, above all, in the reality concepts of the 1960s–1990s inspired by digital technologies as well.

27 Quien 1997.

28 Sachsse 1997.

29 Quien 1997.

30 *„Sie greifen Raum im zweierlei Sinn: von uns, indem sie verlangen, daß wir uns in ihnen bewegen, und von sich selbst, indem sie auf nächste, neue, mögliche und wahrscheinliche, aber immer überraschende Realisationen verweisen*." Sachsse 1997.

31 Quien 1997.

32 „Oft genug ist ihre Plazierung im Raum der Installation noch so, daß sie als aggressiv empfunden werden muß – die Kästen springen einem aus der Wand geradezu entgegen. Sabine Kacunko macht sich ein Stilmittel der *Arte povera* zunutze die ja auch die Besetzung der trivialen Objekte, einfachen Formen und armen Materialien oder Oberflächen ihren Betrachtern und Benutzern überließ." Sachsse 1997.

33 „Den Fotoarbeiten von Sabine Kacunko eignet eine Fragilität und zugleich Härte wie von schwarzem Porzellan – durchgefärbt, nicht angemalt, um in dem Vergleich zu bleiben. Dass diese Härte ambivalent ist und sehr wohl poetische Dimensionen hat, ist kein Widerspruch, wie auch Fragilität Stringenz und Bestimmtheit nicht ausschließt. Kompromisslosigkeit, künstlerische Radikalität im besten Sinne sind die geistig-sinnliche Klammen, die beide Pole zur Deckung zwingen." Flemming 1997.

34 Quien 1997.

35 „Der physiologische Blick weicht dem phänomenologischen Blick, der sich nun auf die Vieldimensionalität der Dinge und ihr perspektivisches Sein richtet. Und für die Künstlerin gilt von ihren ersten Arbeiten an, daß das Alltägliche sich selber unaufhörlich als ortloses Schauspiel gestaltet, das Reale wird spektakulär, es geht eine Faszination von ihm aus." Kösters 1998.

36 „Als reine Kontemplation rühren die Arbeiten ans Absolute und gewährleisten unmittelbar die Verknüpfung von Mentalem und Physischem, Realem und Imaginären, Welt und Ich, nachdem die Aktion in der Fotografie zum Stillstand gekommen ist. Diese rätselhafte Atmosphäre des Stillstands, Inbegriff eines merkwürdigen „Sogs", „Stillkreisend" in der Erstarrung, in der das Leben gerinnt. Zugleich ist die Stillsetzung des Organisch – Lebendigen die ontologische Passage zur gewesenen Realität, zum Ursprung des Lebens, zur archai, zum Mythos. Erinnerung an die Vergangenheit, an den Ursprung? In der beinahe sakralen Fixierung des Lebendigen im Schwarzweiß der Fotografie als archerypische Symbole für Geburt und Tod wird das reproduziert, was sich existentiell singulär, unwiederholbar ereignet. In diesen Kamera-Arbeiten findet sich keine Zukunft, keine Vergangenheit, darin liegt ihre Melancholie – in der Stillegung der Zeit." Kösters 1998.

37 Cf. Thürlemann 1990, p. 73.

38 *BOOTSCHAFT / SAY(IL)ING* was started in 2005 in Düsseldorf with a media-based performance on the central castle square (Burgplatz) with the illumination of a patina particle from the residence of the Elector "Jan Wellem" and his second wife, the Florentine princess Anna Maria de Medici. – For this section I have widely used the second passage (*Life, death and dusty rebirth: bacterial circuits and infinitesimal aesthetics*) from a longer, recently published essay (Kacunko 2015).

39 The following artists, working both under and outside the label 'Bio Art' have worked more or less intensively with bacteria: Eduardo Kac, Edgar Lissel, Critical Art Ensemble, Adam Brown, Joe Davis, Marc Quinn, Wim Delvoye, Thomas Feuerstein, Tuur Van Balen, Anna Dumitriu, Andy Gracie, Marc Dusseiller, Yashas Shetty, Mukund Thattai, Paul Vanouse, Marta de Menezes, Peta Clancy, Andre Brodyk, Julien Haye, SymbioticA, Oron Catts, Karen D. Thornton, David Kremer, Francois-Joseph Lapointe, Gjino Šutić, Erich Schopf.

40 The artist (Berlin) is married to the author (Copenhagen). At this point neither the pre-history nor the process of their converging or intersecting interests in bacteria research could be illustrated in detail. Any questions on the independence of their respective work and research and transparency, as well as on their possibly challenged scientific or artistic distance, can be answered by visiting their individual websites (www.slavkokacunko.com; www.sabinekacunko.de) as well as by using other independent offline and online sources (e.g. institutions they both have worked with, reviews, critiques etc.).

41 Schmitt 1982, p.139ff. – Cf. *Pflanzenschutz und Umwelt*. Ed. From the Industrial association for herbicides and pesticides (incorporated society) (IPS), Frankfurt/M. – Cf. F. Klingauf, International Symposium for plant protection on 5th May 1981 in Gent, Belgium. Bulletin Deut. Pflanzenschutzd., Braunschweig 33, p. 159.

42 Size: 400 cm x 600 cm. Material: 20 Kb slides / 1 light box 20 cm x 200 cm / 1 negative 9 x 12 cm with bacteria cultures / 1 live camera / 1 computer / 1 projector / 1 metal shelf.

43 As in the installation *Origin of Light* (2001) the neon tubes attached to a motion sensor were secured to the wall and activated through the motion of the exhibition visitors. But unlike the 2001 installation, the motif could be recognised in *Product of Life* when the light was turned off. Otherwise one could see within a deep black and strongly reflecting surface, the observer itself.

44 University of Oldenburg, Department for Microbiology.

45 The term will be used without quotation marks in the remaining text.

46 Wolfgang Krummbein, verbal statement in an interview with author, Berlin 2009.

47 Meanwhile also old, possibly the oldest, cyanobacteria have been confirmed in New Mexico. However, this fact plays no significant role in the current topic.

48 Cf. publications by Ulrich Ruschig and the Research Center for Critical Natural Philosophy (University Oldenburg). – Cf. Werner Heisenberg, 'Die Goethesche und die Newtonsche Ferbenlehre im Lichte der modernen Physik' (1941). in Heisenberg, W 1984, *Gesammelte Werke* (ed. by W. Blum, H.-P. Dürr u. H. Rechenberg. section C. Volume 1.). Munich, pp. 146–60. – Cf. J. Pawlik, *Theorie der Farbe*, Cologne 1969.

49 The charge transfer is presumed to be a possible cause for the change in colour of the surface. – Cf. Krummbein 2003 – Cf. Gorbushina, A A & Dornieden, T & Krumbein, W E 2000, Eppard, M, W E Krumbein, C Koch, E Rhiel, J T Staley & E Stackbrandt 1996.

50 Gregory J. Velicer and Yuen-tsu N. Yu from the Max-Planck Institute for developmental biology in Tübingen. Cf. *Nature*, vol. 425, 4, Sept. 2003. Further information online at [www.tuebingen.mpg.de].

51 Although two stems, which spring from the *Pili*-less mutants, have re-developed the ability of social swarming, they managed it with mechanisms and patterns fundamentally different from the wild type.

52 The following lines describe vividly this sort of social Darwinism: "*When the times get tough, the bacillus gets pregnant. The bacilli usually split evenly and homogeneously. As soon as tough times come, one of the two daughter cells or the mother cell transforms into a non-survivable protective cover. In this manner one of the two cells can outlive for centuries to reach new green habitats. The other will never again come alive. Affectionate self-sacrifice death and altruism are seen in the evolution theory too as the better survival principle, as 'kill in order not to be killed'.*" W. E. Krumbein, *Der Tod und die Mikrobe, was mich wieder an Hofmannsthals Thor und Tod erinnert (Lori Oliwenstein, 1996)*, 1997.

53 The performance opened the 17th ICOMOS general assembly, which was under the auspices of the French President, Nicolas Sarkozy, and Irina Bokova, the Director-General of UNESCO.

54 The project *CRYSTAL MIRROR* in Paris made it also possible to trace back this story with a virtual parcours through Paris and to communicate complex relations between the environment and humankind with apps designed by Sabine Kacunko. By using additional GPS software the hotspots of the parcours (Louvre, Planetarium, Obelisk, Museum of Natural Science) became places that could actually be experienced.

55 Cf. W. E. Krumbein W. / G. S. Levit, 'Die Erde Lebt', in Einblicke, 25, 1997, pp.4–7.

56 Further thoughts and observations from the field of dynamic morphology can be found in the D'Arcy W. Thompson's classic inquiry, in which the "very complicated phenomenon" of the asymmetry of the cell and the emergence of the chemical asymmetry according to the difference in the inner and outer pressure on the nucleus of the cell has been described. Cf. D'Arcy W. Thompson 1917: 166; 168ff.

57 The quote is available online at [http://www.presse.uni-oldenburg.de/f-aktuell/9714ebkr.htm]. (Accessed on 18. October 2014).

58 Under this premise a central meaning is ascribed to the topological alignment of biochemical processes for the understanding of 'life' in the sense of the cellular activity. "*Cellular membranes never form de novo by self-assembly of their constituents; they always grow, in an essentially homomorphic fashion, by accretion, that is, by the insertion of additional constituents into pre-existing membranes* [...] *All major activities of cells are topologically connected to membranes. In the prokaryotes (bacteria) the plasma membrane (the active membrane inside the cell wall) is itself in charge of molecular and ionic transport, biosynthetic translocations (of proteins, glycosides etc.), assembly of lipids, communication (via receptors), electron transport and coupled phosphorylation, photoreduction photophosphorylation, and anchoring of the chromosome* (replication) (de Duve 1991). *In eukaryotic cells these tasks has been taken over by specific subcellular membrane structures of mitochondria, chloroplasts, the nuclear envelope, the Golgi apparatus, ribosomes, lysozomes etc.*" Hoffmeyer 2006., p. 15.

59 "*It is however important to stress the interdependence of the analog and the digital as two equally necessary forms of referential activity arising like twins in the individuation of that logic which we call life. The digital code is the seat for self-referential activity, i.e. the redescription in a sequential alphabet of all the macromolecular constituents of the organism, whereas the analog codes are engaged in non-self-referential activity, i.e. the semiotic looping of organism and environment into each other through the activity of their interface, the closed membrane. To claim that only the digital twin is semiotic whereas the analog twin remains in the sphere of classical dynamics is to block the only possibility for transcending Pattee's semantic cut position.*" Hoffmeyer 2006, p.17.

60 Bjarnsholt 2013, p. 21.

61 While the former reveals itself in preferring the (3-D) biofilm-matrix to the interest in surfaces and images, the latter reveals its own quasi-iconoclastic potential through the focus on the so called 'karyokinesis' and the processes of the osmotic pressure & cohesion both on intracellular and intercellular level (extracellular polymeric substances [EPS]), as the early research of Wentworth Thompson or LeDuc demonstrated. Cf. Leduc 1912 and Thompson 1917.

62 Wassenaar 2012, p. 178.

63 (Bjarnsholt 2, quoted after: Atlas R M, Bartha R. Microbial Ecology, 4th ed. Menlo Park, CA: Benjamin / Cummings Science Publishing, 1997.)

64 At this point, I can only warmly recommend to those who are still new in the field, Trudy Wassenaar's introductory book which you also can purchase just outside (I think there are still few copies left),

65 Cf. Deakin 1855; Wegerhoff 2012, Caneva 2004, 2008.

66 At all 5 levels and throughout present at 1643, 1815, 1855, 1874, 1951 and 2001 are only Capparis spinosa, (caper), Cymbalaria muralis (Coliseum ivy) and Ficus carica (fig).

67 Pliny the Elder, *Natural History*, 27.71.

68 Cf. his *Deipnosophistaí*.

69 Bjarnsholt 2013, p. 25.

70 One layer beyond lays the *rhizosphere*, a sensitive layer of soil immediately circumscribing the roots of plants which is the breeding paradise for bacteria and for building the biofilm. Cf. early research on this topic including the fluorescent microscopy Trolldenier 1965.

71 *Pseudomonas aeruginosa* could be taken as a model organism; however it will be decided only after a discussion between the experts involved. This bacterium can be researched both in the nature and in the human body as infection, showing different behaviour within the acute or chronic disease. Also, it produces different kinds of biofilm in vivo and in vitro, so providing an excellent example for trying out different visualization and tracking techniques. Thomas Bjarnsholt and his team at KU provide an excellent expertise in *Pseudomonas aeruginosa* documented in a larger number of (also most recent) publications.

72 In her general inquiry about plant biology for cultural heritage (Caneva 2005 / 2008), Prof. Caneva and colleagues are quoting almost throughout pioneering results of Prof. Krumbein's research conducted together with his spouse Prof. Ana Gorbushina on biodeterioration. Sabine Kacunko and I have even published together with A. Gorbushina

some results on Sabine's work on biofilm included in A.v. Humboldt's Sahara-dust in Christian Ehrenberg collection in Berlin. Cf. Kacunko / Kacunko & Gorbushina 2013.

73 Cf. Kacunko, S, S Kacunko & A Gorbushina 2013b, ‚Luftstaub über den Meeren: Wie historische Staubproben Wissenschaftler und Künstler inspirieren'. In D Gethmann & A Wagner (eds.), Staub : Eine interdisziplinäre Perspektive. LIT Verlag Dr. Wilhelm Hopf Vienna & Munster, pp. 151–160.

74 Wassenaar 2012, p. 166.

75 Cf. Caneva et. al. (eds) 2008 on Bioremediation pp. 340ff.

76 Cf. Caneva et. al. (eds) 2008, pp. 344ff. – Knowledge about travertine's chemical nature, physical structure, and geological origin are researched intensively by sedimentology, where further interdisciplinary aspects interesting for our inquiry can be found.

77 Marangoni, Giovanni. 1673–1753: Delle cose gentilesche, e profane trasportate ad uso, e adornamento delle chiese opera di Giovanni Marangoni sacerdote vicentino, ... In Roma 1744

78 Pliny, Hist. Nat. VII. 36, 121.

79 Genau hinweis.

80 Cf. Danish Journal of Archaeology 2015: http://www.tandfonline.com/doi/abs/10.1080/21662282.2014.990310?journalCode=rdja20#.VNYD_fmG96A.

81 For the technical aspects of the construction work on the Colosseum, which is began with an enormous concrete foundation ring capped with travertine, upon which was built a skeleton of travertine concentric rings filled with tufa blocks and roofed with *opus caementicium*, cf. C. J. Lyes (1999), *Roman Architecture from Augustus to Hadrian. The Colosseum: An Analysis of the inherent political and architectural significance*.

82 Ellis, William S., *Glass: From the First Mirror to Fiber Optics, the Story of the Substance that Changed the World* (New York: Avon Books, 1998), 6–7.

83 Ellis, *Glass*, 78.

84 Cf. http://www.schott.com/english/index.html.

85 Quoted after Toyka (ed.), p. 40.

86 Carbonate precipitates in water if there is a lowering of the level of CO_2 dissolved in it. Cyanobacteria, algae, and mosses can contribute to the precipitation of $CaCO_3$. Cf. Caneva 2008, pp. 130–133. The biodeteriorationin of travertine is mainly result of Acidolysis, associated with the release of acids (H+ ions or protons), such as seen in the process of the release of strong inorganic acids, that leads to corrosion. When sulphuric acid (H_2SO_4) produced by sulphur-oxidizing bacteria comes in contact with $CaCO_3$, the soluble salts are formed, as expressed in the equation $CaCO_3 + H_2SO_4 \rightarrow CaSO_4 + H_2CO_3$. In an an aqueous environment such as Bagni di Tivoli, the carbon dioxide (CO_2) is produced during respiration by aerobic organisms, producing carbonic acid (H_2CO_3) as expressed in the equation $CO_2 + H_2O \rightarrow H_2CO_3$. The latter gives rise to acidolysis phenomena on stone, resulting in dissolution of the carbonates of calcium from the calcareous stone and producing of highly soluble calcium bicarbonate $Ca(HCO_3)_2$. Cf Caneva 2008, p. 21–22 and 130–133.

87 Cf. Caneva 2008, p. 137.

88 Cf. Caneva 2008, p. 136.

89 Cf. Caneva 2008, p. 342.

90 Cf. Caneva 2008, p. 342. *Desulfovibrio* is found both in anaerobic sediments and in the intestinal tracts of humans and animals.

91 Found were also: *Bacillus cereus, Bacillus megaterium, Paenebacillus lautus, Paenibacillus glucanotyticus, Curtobacterium albichim (albidum?), Cellulosimicrobium cellulans*, and further *bacillus*-species.

92 This has been met with some resistance, as some argue that this biomineralization is caused by the nucleation of non-living biological molecules. Cf. Folk 1997 and Young & Martel 2010.

(nanobacteria links:)
http://www.scientificamerican.com/article/the-rise-and-fall-of-nanobacteria/
http://serc.carleton.edu/microbelife/topics/nanobes/index.html
http://naturalscience.com/ns/articles/01-03/ns_folk.html (Robert L. Folk) (ein Ausschnitt hier nur: Together with Professor Henry S. Chafetz of the University of Houston, I began work on the Italian travertines in 1979. In the course of this research it was discovered by chance that "normal-sized" bacteria, mainly sulphur-oxidizers, had played a very substantial role in precipitating this stone from the warm springs at Tivoli. Before this discovery neither Chafetz nor myself knew or cared anything about bacteria, as we were specialists in microscopic examination of limestones. In 1988, I returned to Italy to study the hot-spring travertines of Viterbo, about 50 km northwest of Rome.

93 Cf. Lange-Asschenfeldt, B et. al. 2011 [DOI: 10.1159/000328728]. With thanks to Thomas Bjarnsholt for hints and references.

94 Cf. Cheung (Bibliography).

95 "*This organisation of process is carried out by any dividing cell, yet it is stunning that we have no language – at least, no mathematical language of which I am aware – able to describe the closure of process that propagates as a cell makes two, makes four, makes a colony and, ultimately, a biosphere. This self-propagating organisation of process is contained in the concept of an autonomous agent [...] The cell exhibits a form of organisation that is not captured by our concept of information – a concept that leaves out any mention of constructing constraints on the actual occurrence of anything in the real physical world.*" Kauffman 2002, p.135.

96 "*Could you say that an obscure molecular mutation in a bacterium might allow the bacterium to detect a calcium current from a ciliate and take evasive action? I think not. More generally, I think we just don't have the concepts ahead of time to state what all possible Darwinian preadaptations might be, nor can we state what all possible environments might be.*" Kauffman 2002, p. 137.

97 Cf. quote in J. Rodman, The Liberation of Nature? In: Inquiry 20 (1977), p. 83ff; P. Wienpahl, *The Radical Spinoza*. New York 1979.

98 Bruno Latour, *Wir sind nie modern gewesen. Versuch einer symmetrischen Anthropologie*. Berlin 1995 (fr. Paris 1991), pp. 85–86.

99 Massimo De Carolis, *Das Leben im Zeitalter seiner technischen Reproduzierbarkeit*. Zürich/Berlin 2009 (ital. Torino 2004), p. 205.

100 De Carolis 208

101 Deleuze, 2006, p. 387.

102 Cf. Krumbein (Bibliography).

103 This is not the place to tackle the often less than fruitful Art/Technology debates with their penchant for release-and-rescue rhetoric. For critical summaries cf. Zilberg 2011 / 2012 / 2013 and Malina 2009 / 2010a / 2010b / 2014.

104 Meillassoux 2008, p. 5.

105 (ibidem, cf. Latour 1993 and Chapter 10)

106 (52) For further critique of different anti-rationalist perspectives see Kitcher 1993 and Boghossian 2007, works especially pointed out by Harman. (Kacunko 2015, p. 16.)

107 It includes Ray Brassier, Graham Harman, Ian Grant and Levi Bryant, representative of a much wider circle, including the older generation, such as Alain Badiou, Slavoj Zizek and others.

108 Bryant et al. 2011, p. 4.

109 Cf. Crowther, P (2004). 'Defining Art, Defending the Canon, Contesting Culture'. In *British Journal of Aesthetics*, Vol. 44, No. 4, October, pp. 361–377, here 375.

110 [...] and this is exactly what the digital art does; digitally presenting analog natural processes, i.e., creating analog images out of digits." Peter Weibel admitted in 2000 (like Lev Manovich, though less directly back in 2001), Weibel „Wir wollen aber bei dieser Unterscheidung [...] einige philosophische Ungereimtheiten übersehen, wie diese, dass natürlich in der digitalen Kunst analoge Elemente und in der analogen Kunst digitale Elemente vorhanden sind, denn letzen Endes ist jeder kontinuierliche, analoge Vorgang in kleinste diskontinuierliche Teile zerlegbar, so wie eine kontinuierliche Linie durch diskontinuierliche Punkte konstruiert werden kann [...] Und genau das macht die digitale Kunst, analoge Vorgänge der Natur digital darzustellen bzw. aus Ziffern analoge Bilder zu erzeugen"] (206/207)

111 Cf. Nochlin (Bibliography).

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SABINE KACUNKO

Catalogue of Works 1990–2015

B&W Photographs, Photographic Installations and Slide Installations

85 Sabine Schmidt, *Self-portrait* (1989), b/w photograph.

86 Sabine Kacunko, *Creature* (2001), b/w photograph, 200 x 280 cm, plexiglas, alu-dibond.

87 Sabine Schmidt, *Sog* (1994), b/w photograph, Ø 200 cm, plexiglas, alu-dibond.

88 Sabine Kacunko, *Body of Revolution* (2001), b/w photograph, 200 x 300 cm, plexiglas, alu-dibond.

89 Sabine Kacunko, *The Big Container* (1997), b/w photograph, 150 x 350cm, plexiglas, alu-dibond.

90 Sabine Kacunko, *Coco de Mer* (1997), b/w photograph, 180 x 180cm, plexiglas, alu-dibond.

91 Sabine Kacunko, *Iris* (1997). b/w photograph, Ø 200 cm, plexiglas, alu-dibond.

92 Sabine Schmidt, *Untitled* (1994), b/w photograph, 120 x 280 cm, plexiglas, alu-dibond.

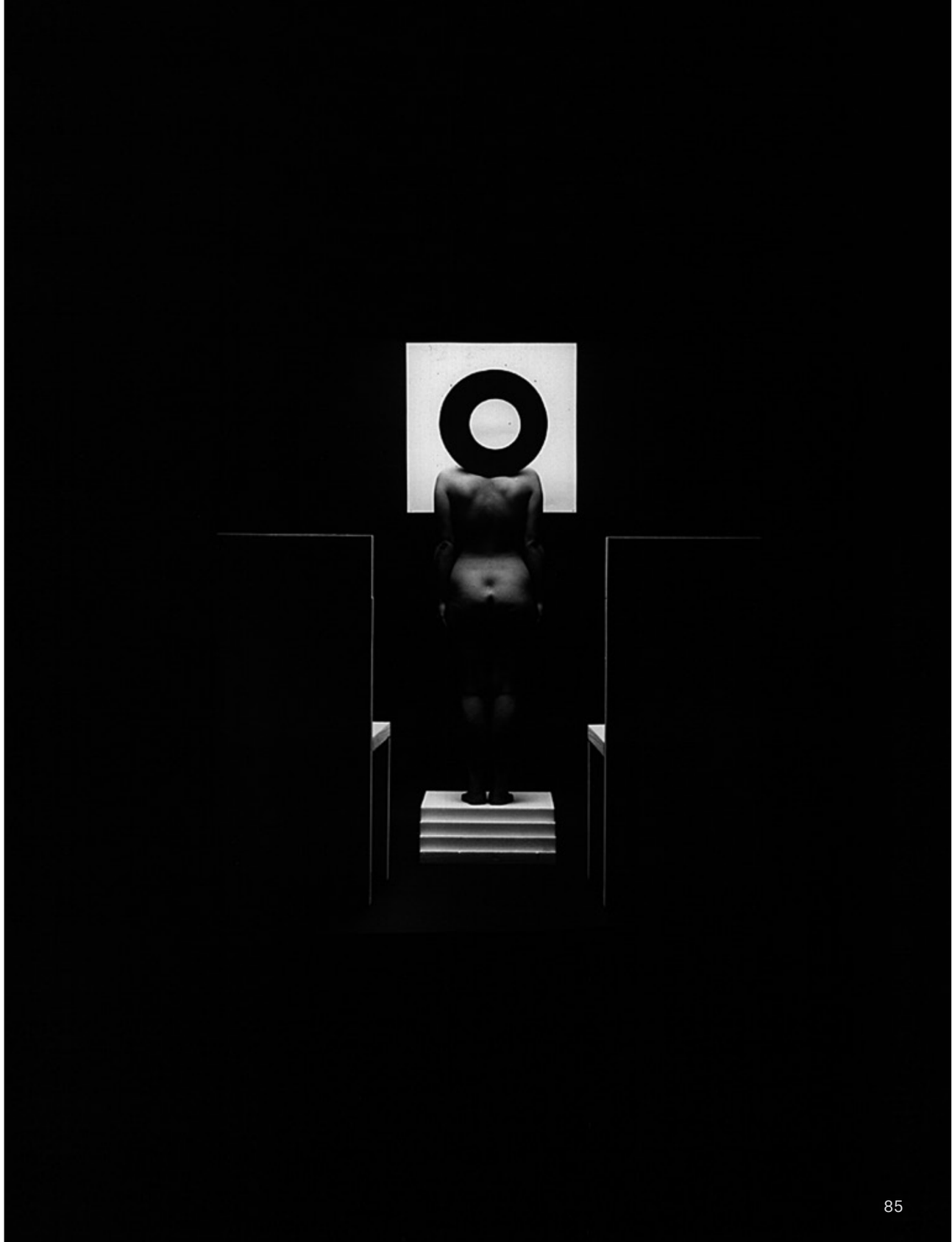
93 Sabine Kacunko, *Lotos* (1997). b/w photograph, 340 x 140 cm, plexiglas, alu-dibond.

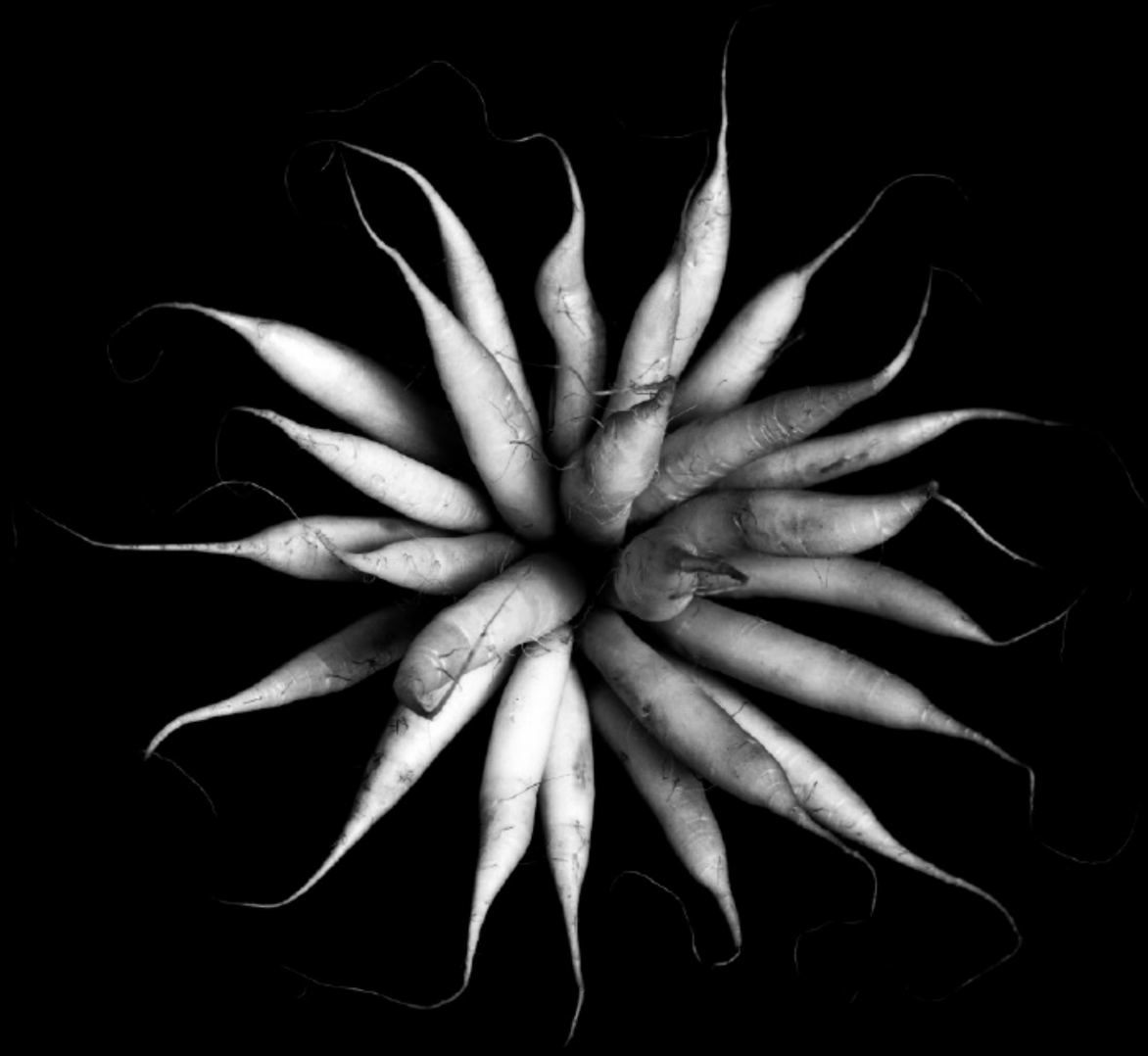
94 Sabine Kacunko, *Out of Sight II* (2000), b/w photograph, 300 x 180 cm, plexiglas, alu-dibond.

95 Sabine Kacunko, *Out of Sight III* (2000), b/w photograph, 300 x 200 cm, plexiglas, alu-dibond.

96 Sabine Schmidt, *Sunflower* (1995), b/w photograph, 175 x 175 cm, plexiglas, alu-dibond.

97 Sabine Schmidt, *Fertilisation* (1994), b/w photograph, 180 x 180cm, plexiglas, alu-dibond.



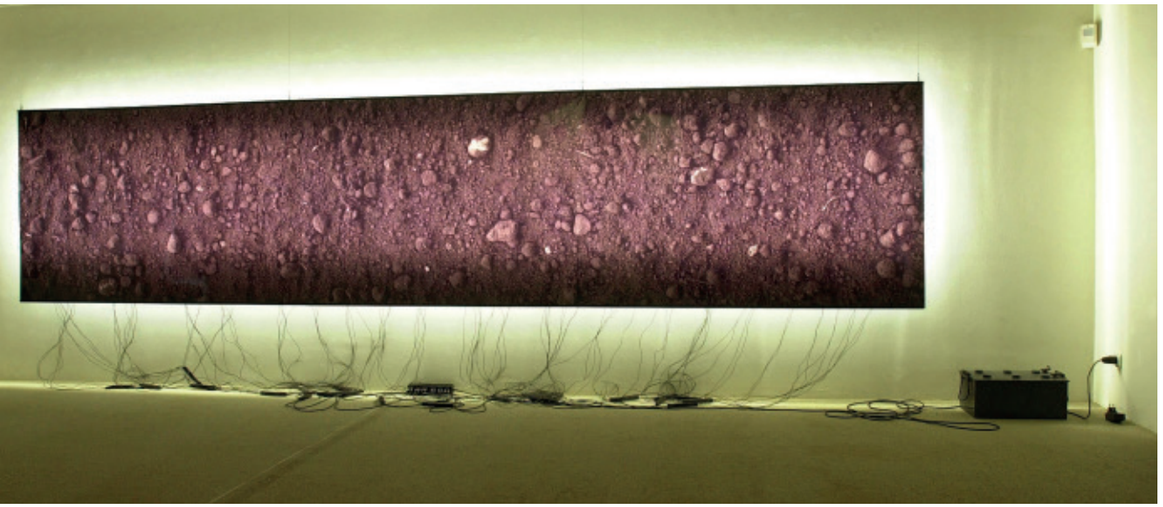


Top: Sabine Schmidt, *Vanitas* (1994). Installation, 90 x 60 x 50 cm (2x); 280 x 80 cm. Solo-exhibition Sabine Schmidt – *Out of Darkness*, Gallery Jasim, Düsseldorf 1994.
Bottom: Sabine Schmidt, *Der Schrei* [Scream] (1992). Installation, 140 x 140 cm x 50 cm (3x); at the exhibition in the Photo gallery *Fabrik Heeder*, Krefeld.

Sabine Kacunko, *Dunkle Träume* (1997). Installation, 300 x 1200 x 50 cm at the BBK-gallery, Düsseldorf 1997. Thereafter exhibited during a solo-exhibition at the City Gallery Wesseling 1998.

Right: Sabine Kacunko, *Fish* (1997). B/w photograph, 340 x 140 cm. Plexiglas, alu-dibond. An unrealized project from 1997 (*Out of the Blue*) demonstrates the shift toward more spatial organization of photographic exhibits, while the loaded narrative, in this case related to the fish, remains the focus of interest. The artist suggested here a sculptural installation for the room of approx. 30–35 m^2. A black, initially closed freight container measuring 250 x 350 x 60 cm was to be placed in the centre of the room. The container was lined with black velvet and a large-format black-and-white photograph installed inside it. The photograph shows three heads of the St Peter's fish (John Dory), which has a strong symbolic relation to the artist's statement. The biblical St Peter – who unites the promise of faithfulness (1), denial of the beloved person (2) and repentance (3) – symbolizes therewith a 'process of faith', which in this case is occasionally revealed from the sensorially comprehensible protection of the transport-container and – comparable to the apostolic mission of the fisherman from Galilee – is equipped for the artistic and human task. The 'doubling' and 'interpenetration' of symbolic meaning is, in this case, deliberate on the artist's part: the fish is mainly the symbol of Jesus Christ (fish = Greek ἰχθύς, Jesus Christ, our Lord and Saviour). The symbol of the fish, one of the artist's favourites, can retain a hidden 'meaning', even when the knowledge of the 'conventional' value which unites both parts, i.e. the picture and its signifiedis lost (cf. Thürlemann, p. 73). While the universality of this 'primal' symbol allows a generalization and spontaneous acceptance, this does not apply to the long line of symbols, which appears from occasion to occasion, epoch to epoch. In this context, the artist relates to the circumstance that the communication and therewith the understanding of the art itself only happens partly instinctively and autonomously. The symbolic constitution of Sabine Kacunko's work demands such an analysis of meaning, which forms a precondition for the development of her large-format photographic objects. The mimetic-discerning, mythological-religious and historical-ethnological apprehending of the 'Pandora's box', which was actually intended here, interacts in the process of constituting the symbol and offers an exciting effect of the sensorially perceivable expression and the cognitive idea relating to it.

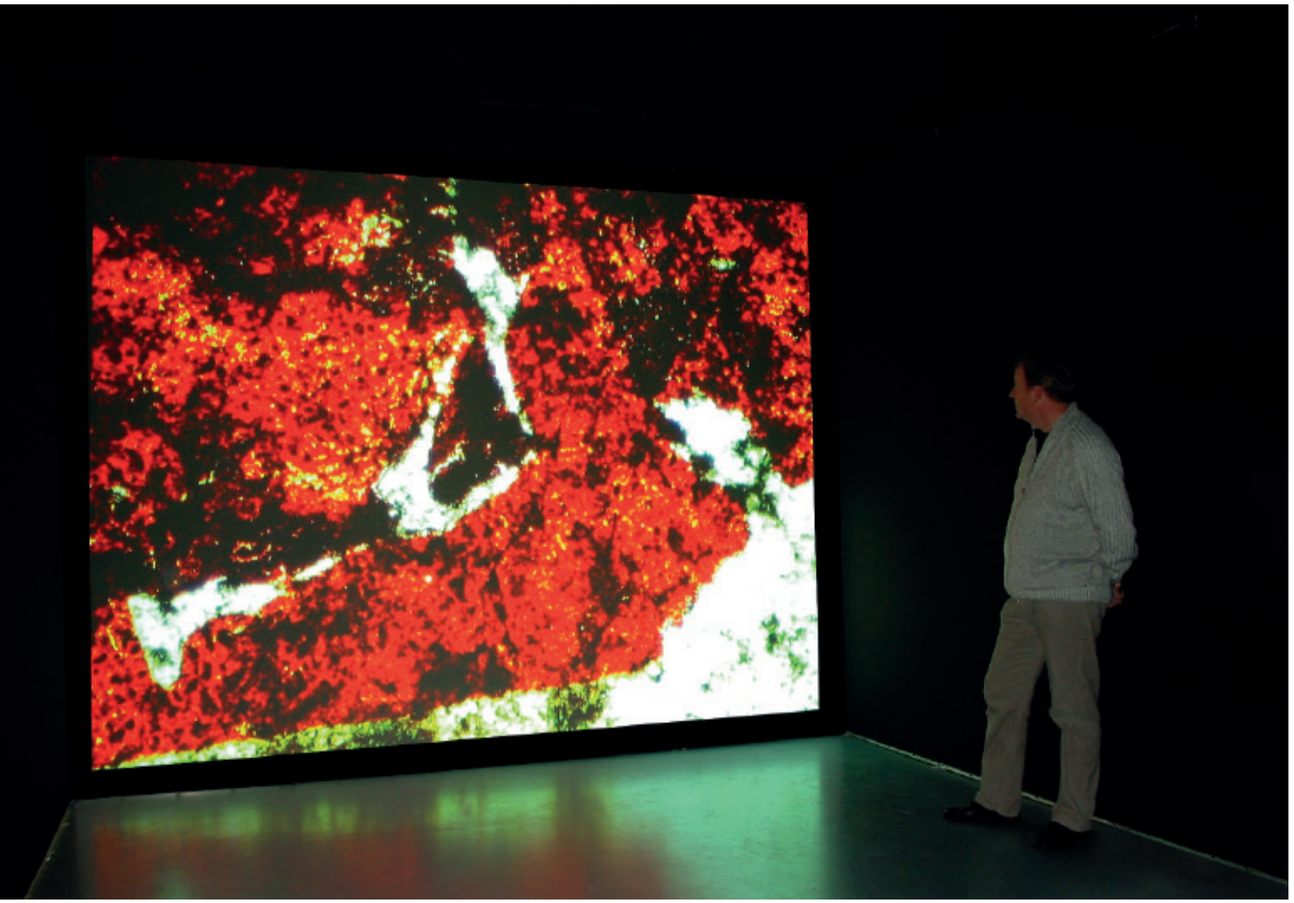
Sabine Kacunko, *Origin of Light* (2001). Interactive light installation, 130 x 800 x 20 cm. Solo exhibition at the Galerie Schüppenhauer, Cologne. This photographic work consists of a large-scale transparency showing 23 altar candles without wicks, in front of black satin. Using a specially made hanging system, the transparency is fixed 15 cm from the wall. Behind the screen, 23 fluorescent tubes are attached, so that every candle is lit by one of them. The particular property of the *Dura-Clear* slide material allows the sources of the light to be discernible, along with the cable system, only when the light has been switched on. The lights are connected to a motion detector, so that it is only the visitors' movements that turn the light on and illuminate the slide, for thirty seconds a time. The energy required for the light sources is supplied by solar cells attached to the window wall facing the installation. Supported by Osram. The installation was also shown in 2002 during the solo exhibition *Sabine Kacunko – Origin of Light* at Gallery 44 in Barcelona (2002).

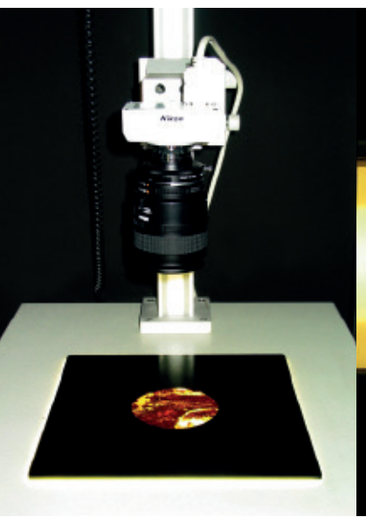


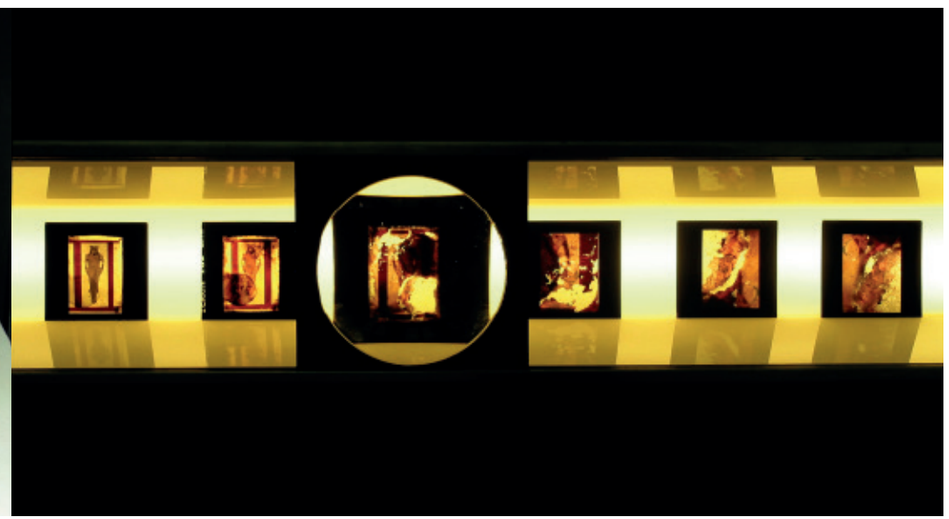
Sabine Kacunko, *Mutter Erde (Mutterboden)* [Top Soil] (2002). Interactive light installation. b/w-photo slide, metal, neon tubes, motion detector, solar cells. 130 cm x 500 cm; at the exhibition *From Moment to Movement. International exhibition of photography*, Art Pavillon, Zagreb 2002. The installation (126 cm x 600 cm x 20 cm) was shown in the same year at the Galerie Mönter in Düsseldorf.

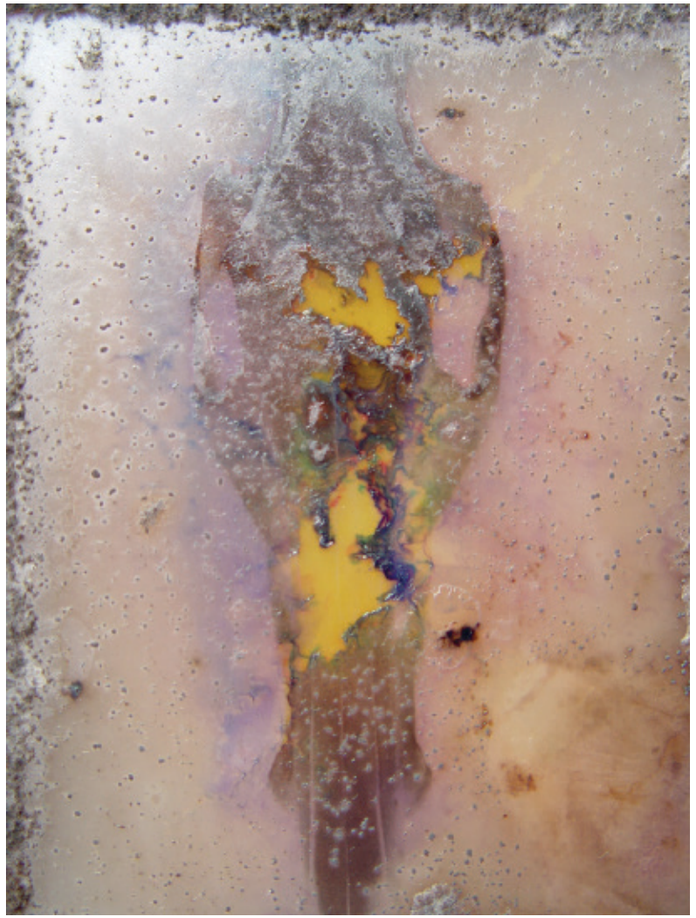
Sabine Kacunko
Product of Life
(2002)

Size: 400 cm x 600 cm. Material: 20 Kb slides / 1 light box 20 cm x 200 cm / 1 negative 9 x 12 cm with bacteria cultures / 1 live camera / 1 computer / 1 projector / 1 metal shelf. Kunstmuseum in Düsseldorf im Ehrenhof (08.12.2002–10.01.2003). Düsseldorf. Photos were taken on 14.12.02. Reproduced are among other negatives of the wild boar skull (Schädel, 1997) populated by with microorganisms. Fungi (*Aspergillus versicolor, Trichoderma sp., Phoma sp.*) and bacteria (*Pseudomonas, Bacillus, Corynebacterium*) were applied and cultured for Sabine Kacunko by Wolfgang E. Krumbein at the University of Oldenburg.



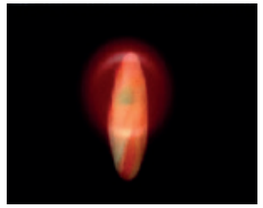






Sabine Kacunko, *Product of Life*, 2002.

Sabine Kacunko
Out of Control
(2002)



Public art event, Kassel, 2002. 8 female performers, 16 black limousines, 8 monitors, 8 altar candles, 8 black towels, 1 helicopter, 1 live camera. Venue: Audi Centre Kassel, Dresdener Str. 5, 34125 Kassel, surrounding motorway access, airspace / helicopter, one tram driving through the city centre. *Out of Control* was a part of the performance in the public space in Kassel conceived as a *Trilogie der Bewegung* [Trilogy of Movement] (06.06.2002). The first phase of the 'trilogy' represented a tram from the Kassel transport services covered with photographed candles, as seen in the artist's previous photographic work. The tram was thus transformed into an art object, a kind of 'kinetic sculpture'.

The second phase of the trilogy, entitled *Out of Control*, was the central event. It revolved around the exhibition in the Audi Centre in Dresdner Str. 5 in Kassel, in the immediate vicinity of the city centre. The slow, spatial proximity to the exhibition site was an important element in the artist's overall concept, which related to mobility. Not only was the exhibition hall of the Audi Centre involved in this kind of *Gesamtkunstwerk* (total work of art), but also the free space around the Centre. A beam of red light shone into the night sky from the roof of the hall. As 'guests of honor' or 'stars' of the event, 8 black limousines were placed on an imaginary red carpet in the hall's red-lit interior. From the limos emanated a monotonous computer-generated] sound. On the roof of each vehicle a long candle without a wick had been placed, with a monitor suspended above each of them. The video showed fire in an almond-shaped cutout of a black mask, so that the overall appearance was a reminiscent of the candle flame. The religious appeal of this installation refers to an almost religious worship of technological progress, while reality and virtuality were compared and scrutinized.

The opening event was accompanied with a performance by 8 actresses, who seemed at first to be waitresses. At a certain point (around 8 pm), after it had become dark, the performers left the hall holding the candles which had previously stood on the car roofs. In front of the hall, eight additional vehicles were parked with upward pointing headlights mounted on their roofs. With switched on lights, the journey continued on the nearby roundabout. A helicopter observed the moving vehicles in the circle, giving the impression that the event was monitored, recorded and documented. On the monitors in the exhibition hall and the Internet was now shown a circle of light on a black background, announced with a countdown. It gave the impression that these were images of a live transmission of the cars moving in a circle. Questions of perception, deception, confusion and authenticity were raised and taken as starting points for further discussion. The presentation ended when the performers came back and returned the candles to their original positions on the parked cars.

In *Culture Round Culture* (installation with the large greenish screen at the upper left of the photograph), a process of slow decomposition of a negative showing a fish was exhibited. Fungi (*Aspergillus versicolor, Trichoderma sp. Phoma sp.*) and bacteria (*Pseudomonas*, *Bacillus sp. Corynebacterium*) were applied and cultured for Sabine Kacunko by Wolfgang E. Krumbein at the University of Oldenburg. A projector showed the various stages of decomposition of the negative lying under a video microscope. The viewer became a witness to the different stages of decay and destruction. The transient matter became the origin and formation agent of something entirely new and different. This project was realized in collaboration with Professor Krumbein, University of Oldenburg.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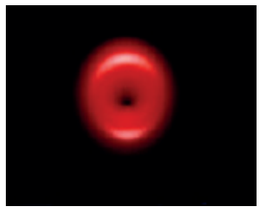
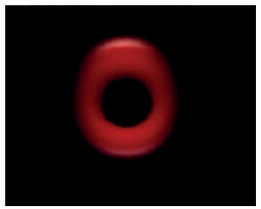
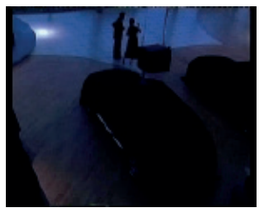
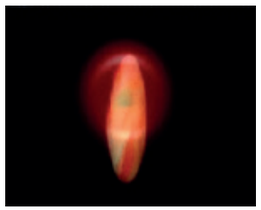
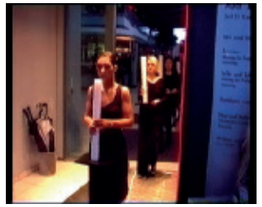





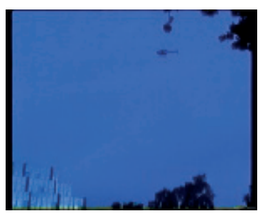




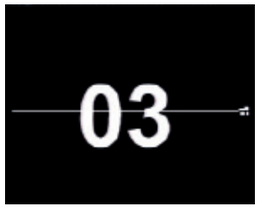



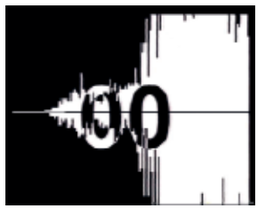











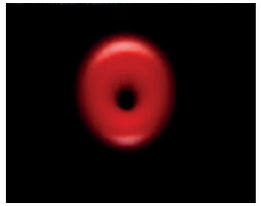
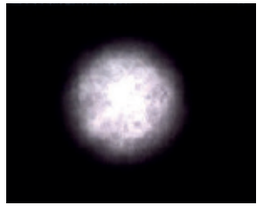






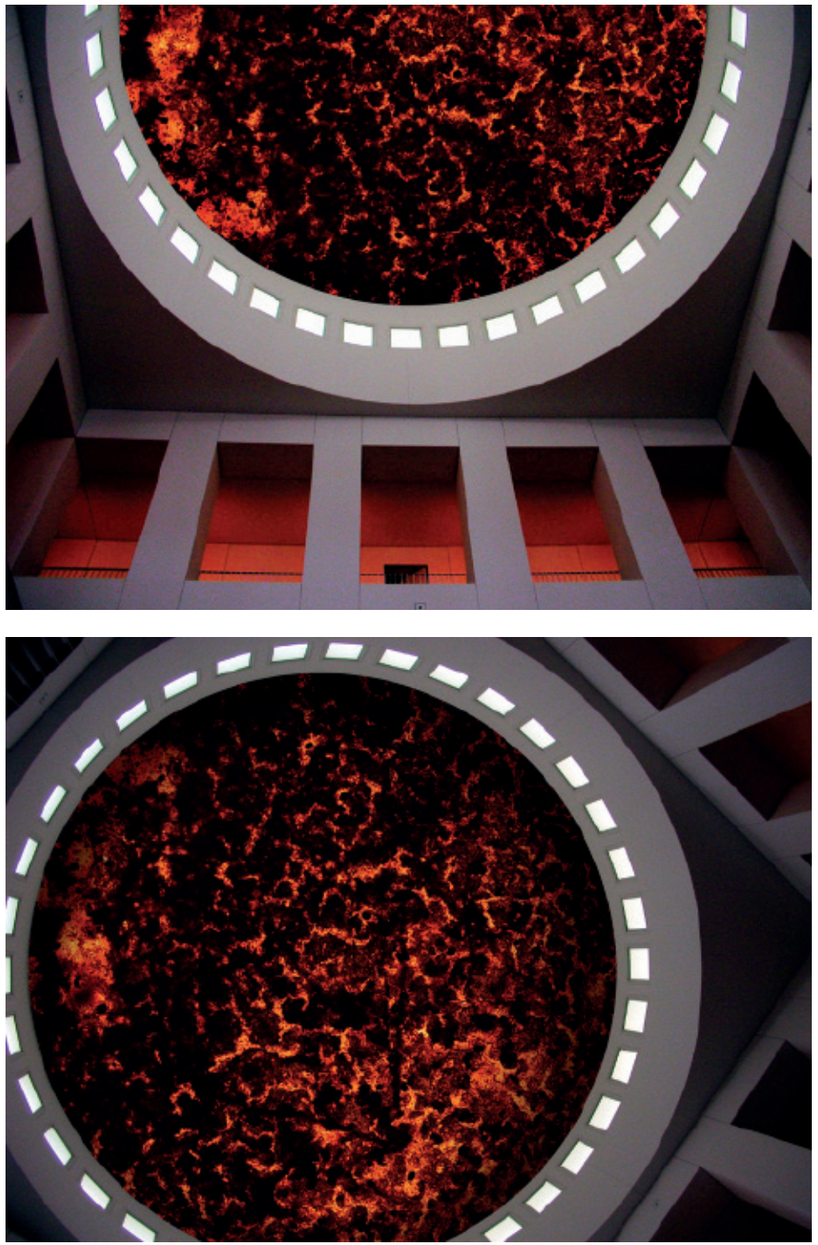





Sabine Kacunko, *Out of Control*, 2002, Offener Kanal Kassel, kunstbar.tv (framework programme of the Documenta11).

Sabine Kacunko
P.O.L. ART – Bloody Moon
(2003)

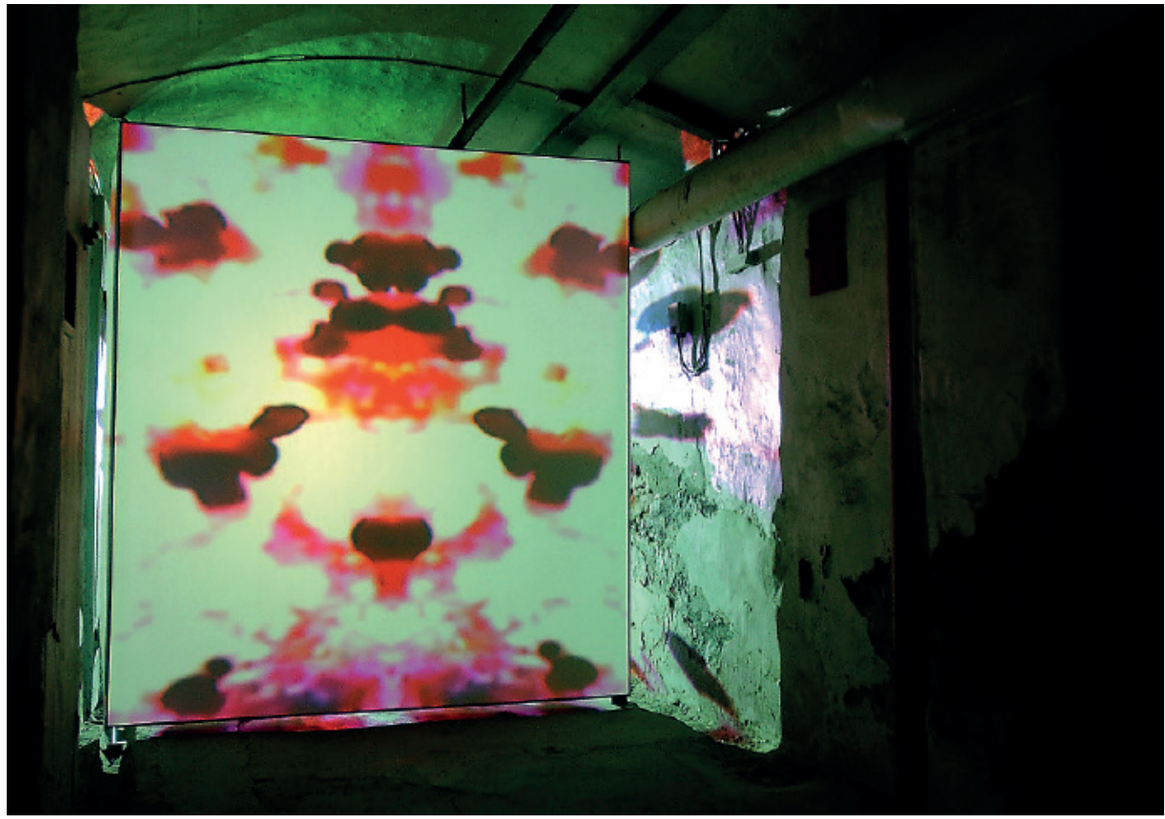


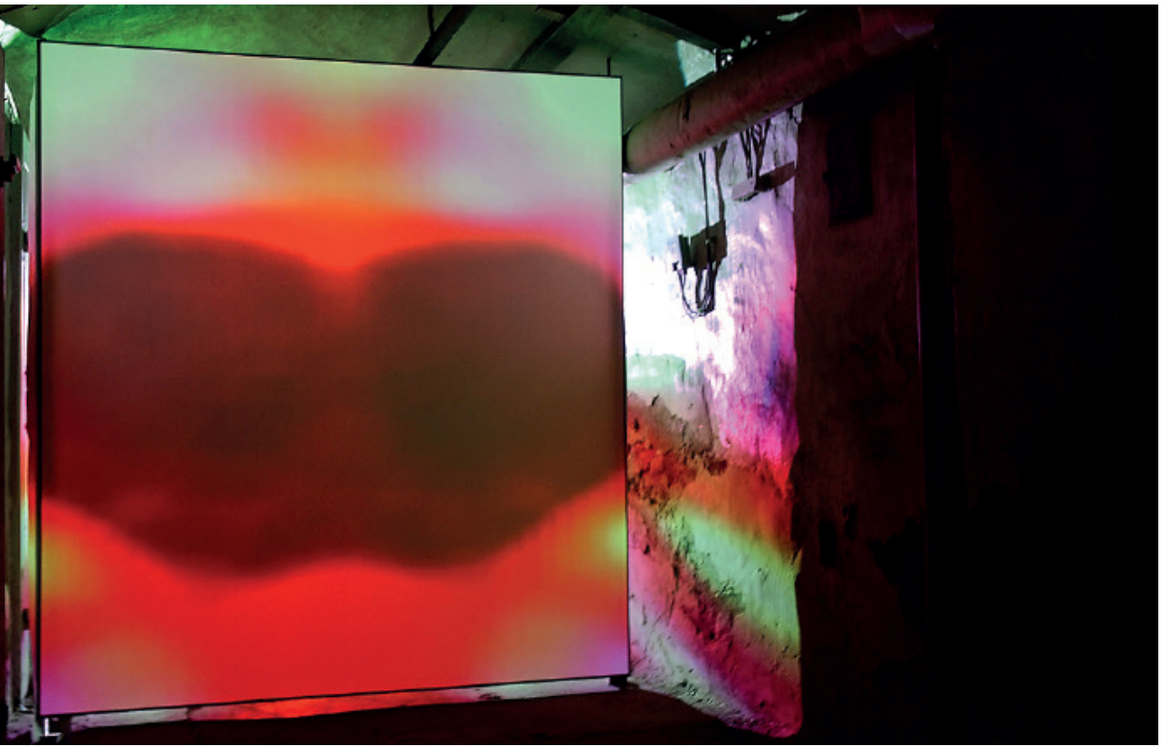
Installation, 1 video-projector, 1 DVD-recorder, 1 poster. Kunstmuseum in Düsseldorf im Ehrenhof, Düsseldorf 2003. Supported by Nikon and SIGMA System Audio-Visuell GmbH.

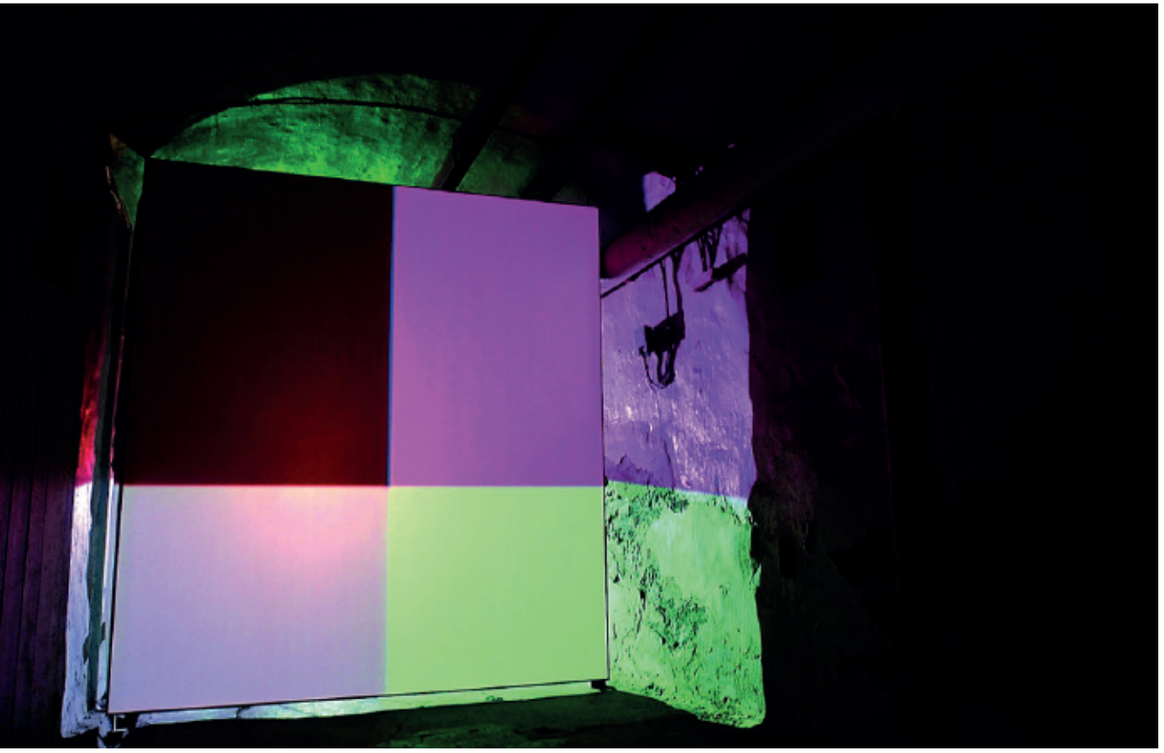
Sabine Kacunko
P.O.L. Art – Endless
(2003)

Video-loop installation. Event: *Lichtrouten Lüdenscheid*. Location: Town Hall, Lüdenscheid. With recourse to digital imaging technology, a record was made of the process of decomposition of a photographic negative (of a fish) when subjected to bacteria. In this process, pigments were produced as waste and rendered in visual form as a pictorial outcome. The microscopic recordings form the point of departure for the video piece. Project was supported by Prof. Dr. Krumbein, Department of Microbiology, University of Oldenburg. The piece was later presented as a one-channel video at the *Pixeldance*-festival at the Aristotle University in Thessaloniki 2004.

Bacterial attack induces premature decay and loss in the black-and-white negative, while the microbes produce pigments as a byproduct of their metabolic processes. With the aid of digital imaging technology, the process of decomposition, the various stages of decay and destruction, are translated into visual form and recorded. The emphasis is on the artistic exploitation of organic processes of dissolution – not on the destructive aspect, but the creative power.



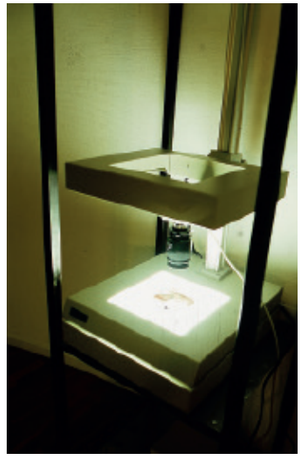




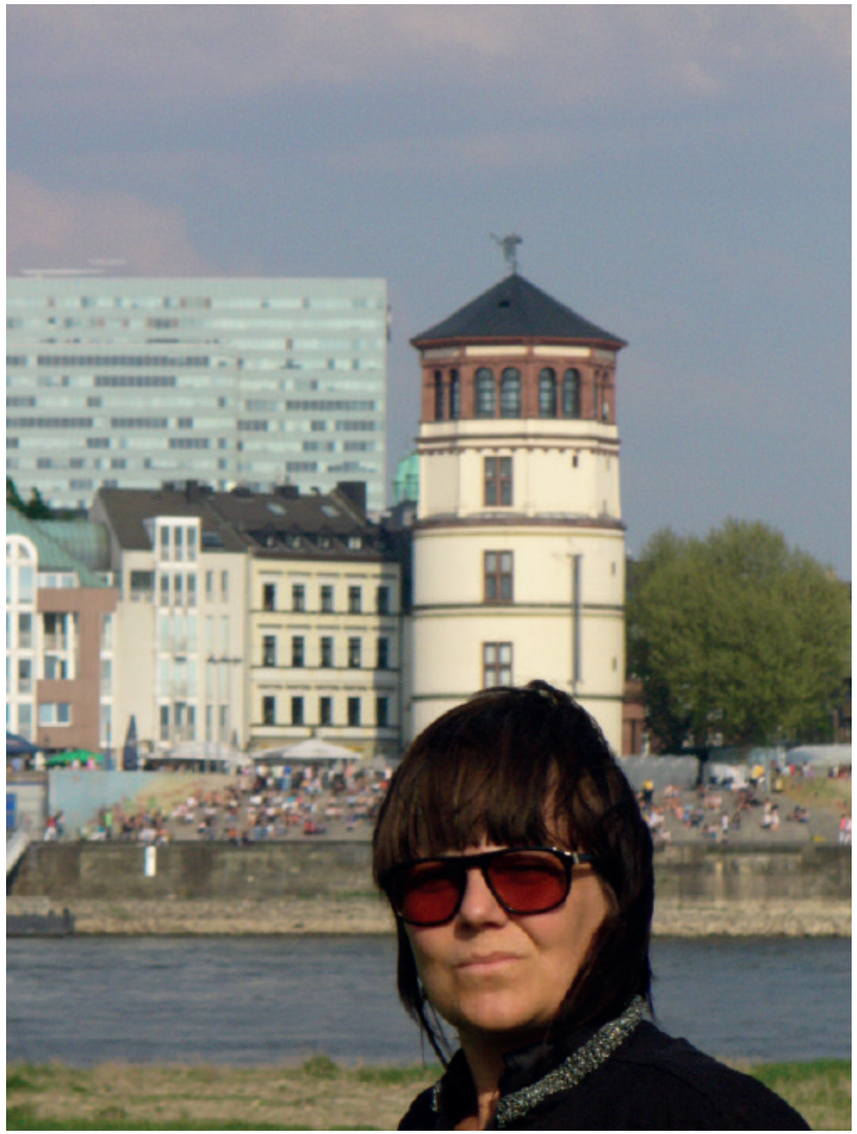
Sabine Kacunko, *Endless* (2003). On the wall to the left is a paraphrase of a statement from Wolfgang E. Krumbein (“*Nichts ist Dreck, alles ist Leben*”).

Sabine Kacunko, *POL.ARTechnics*, Closed Circuit video installation and a photo-installation (2003). 500 x 600 cm, 1 negative 9 x 12 cm with bacteria and fungi-cultures, Petri-dish, a microscope, 1 live-camera, 1 computer, 1 projector, 2 monitores, a DVD player and 3D-glasses for the visitors.

Sabine Kacunko
Leben [Life]
(2003)



Sabine Kacunko, *Leben [Life]*, Installation during the solo exhibition at the Kunstverein Coburg 2003.



Sabine Kacunko, Düsseldorf – Oberkassel, with a view on Burgplatz on the other side of the Rhine, 2004.

Sabine Kacunko

BOOTSCHAFT – Schrittmacher / Wo liegt der Schlüssel? [BOOTSCHAFT – Pacemaker / Where's the Key?]

(26.8.2005)

Media performance in public space. Occasion: *PLATZDA! Sommerauftritt3**. The project was supported by Düsseldorf's City Planning Department. Location: Burgplatz, Düsseldorf.

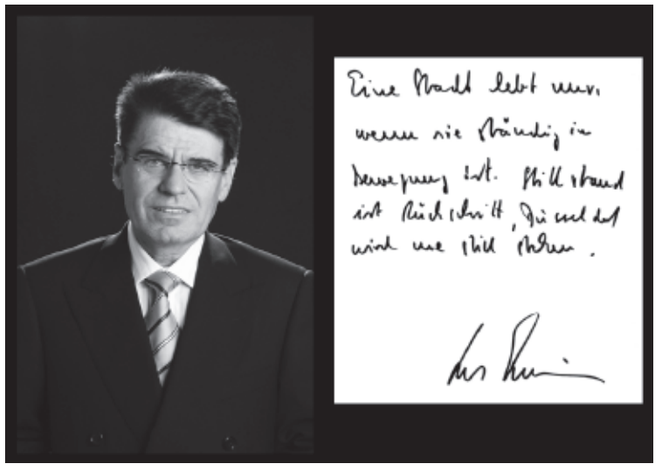
The Burgplatz was a deliberate choice of location: it has a history as a point of departure for seminal impulses that continue to shape cultural life in Düsseldorf to this day. The trigger for Düsseldorf as a city of the arts came when Johann Wilhelm II, Elector Palatine, made it his official residence (1690–1716) and fostered its artistic development. The second marriage of Jan Wellem (as the Elector was known in Düsseldorf) was to the Florentine princess Anna Maria de' Medici, and renowned artists and architects from Italy and elsewhere were called to the provincial electoral capital and invigorated the arts there, until then a neglected sphere. One consequence of this input was the founding of the Electoral Art Collection, which contained important works which, after Jan Wellen's death, were mostly shipped to Mannheim and eventually to Munich. The fortified palace in which the Electoral couple resided burnt down in 1872, and was completely dismantled in 1888. Only the castle tower – the Schlossturm – remained, and survives intact as a landmark on the Burgplatz, the point of departure for the subsequent 'cultural era' of the city. In tune with the BOOTSCHAFT principle (the title punning on *Botschaft* = embassy, message, and *Boot*, boat, + *-schaft*, cf. -ship (!) and recalling *Mannschaft*, crew, team ...), the microcosm of a particle of patina from the Schlossturm was photographed under a video microscope and digitized. These data provided the basis for a video animation shown at Burgplatz on a media sculpture. The shape of the sculpture was developed from the coordinates of a regular octagon and is the core object or fundamental anchor of the BOOTSCHAFT project. That anchor recurs as a linking element. With the aid of this light sculpture, not only were the pacemakers and the historic Burgplatz illuminated, but thanks to the sculpture's alignment toward the Medienhafen, the 'Media Docks', developed over recent years, a symbolic connection to modern-day Düsseldorf was made, not least to the building Kaistr. 13 (architect Wolfgang Döring) in the 'Media harbour', the temporary location of the project-space BOOTSCHAFT, run by Sabine Kacunko.

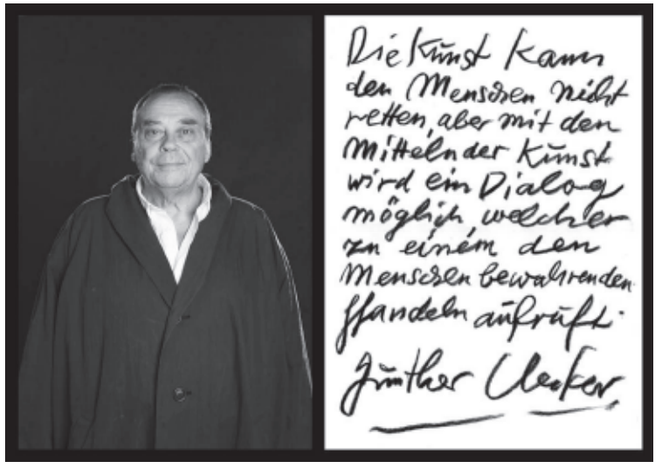
The driving idea behind the media performance, *Wo liegt der Schlüssel?* [Where's the Key?] in *Düsseldorf's* Burgplatz (Town Square), was to give life to and keep alive local history. Presented were '*Schrittmacher*' or 'pacemakers' of different generations, artists and/or cultural initiators 'keeping the city's contemporary arts running', met at this prominent location for the night's performance.

During the light performance, a newspaper was presented from a diplomatic limousine. Some hundred portrait photographs of the participating pacemakers with their '*Botschaft'*/message were recorded in the paper and simultaneously projected onto the main portal of the castle tower.

Schrittmacher / ‚pacemakers': Joachim Erwin (City Major), RP Büssow, Wolfgang Schulhof, Günther Uecker, Tamara K. E., Gia Edzgveradze, Thea Gvetadze, Vera Loers, Edmund Spohr, Katarina Mayer, Gudrun Kemsa, „Konsortium", Dorothee Bouchard, Bruder Matthäus, Robert Solomon Tanzhaus NRW, Performance Group *Everything is all right*, Slavko Kacunko, Horst A. Wessel, "Parkhaus", Werner Frankenhauser, "Filmwerkstadt", Jutta Saum, Ruth Walligalla, Elke Frühauf, Düsseldorfer Künnstlerinnen e.V., Johannes Stüttgen, Heinz Baumüller, Karl-Heinz Theisen, Evelin Theisen, Medici-Club-Düsseldorf, Karl Heinz Rommey, Jost Wischnewski, Ralf Berger, Ivo Dekovic, Ariane Neuhaus-Koch (...).


Die Kunst kann
den Menschen nicht
retten, aber mit den
Mitteln der Kunst
wird ein Dialog
möglich welcher
zu einem den
Menschen bewahrenden
Handeln aufruft.
Günther Uecker


Eine Welt lebt nur,
wenn sie ständig in
Bewegung ist. Stillstand
ist Rückschritt, Tod und
wird uns still stehen.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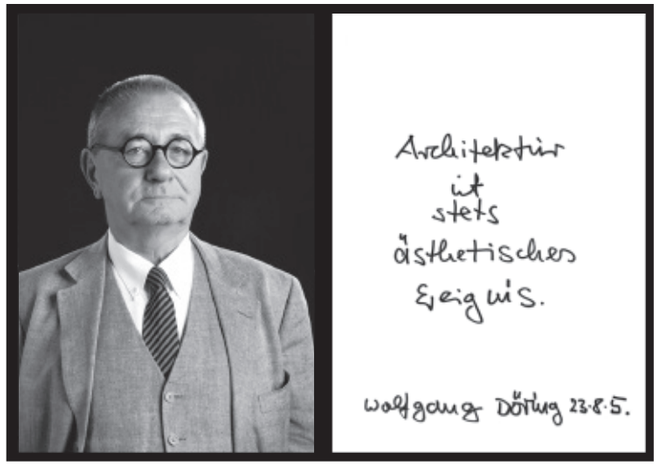
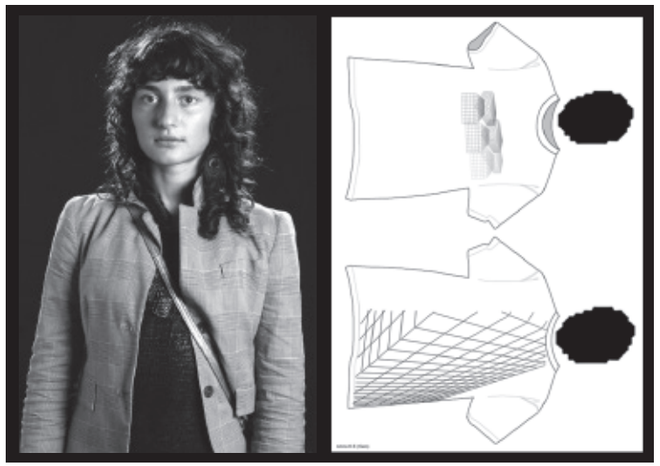
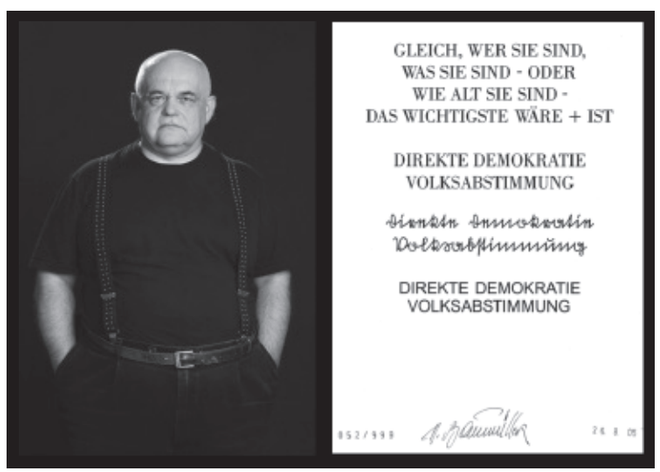
EINE LEBENSGEMEINSCHAFT IM SYSTEM BEFINDET SICH IM KRIEG
AUSLÖSER IST DIE MANGELHAFTE SELBSTVERSORGUNG
DIE VERVIELFACHUNG FUNKTIONIERT NICHT MEHR
VOLLSTÄNDIGE INDIVIDUEN STERBEN AUS
DER GEIST IST NICHT MEHR ZU IDENTIFIZIEREN
DAS ZIEL LIEGT NICHT MEHR IN SICH SELBST
EIN LEBEN GEHT ZU ENDE



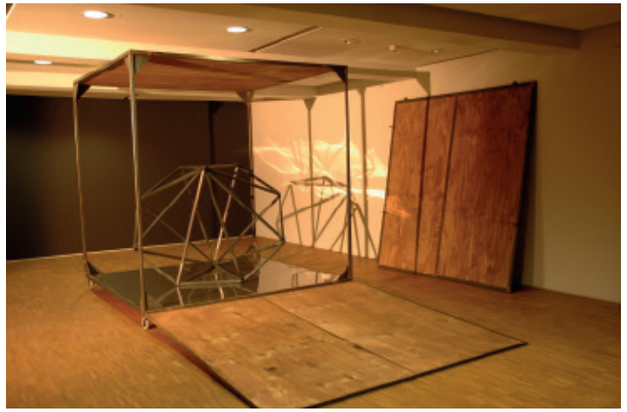




Sabine Kacunko

BOOTSCHAFT – Plange Mühle.
Interactive media installation. Plange Mühle, Medienhafen Docks, Düsseldorf (2006)

A particle of patina was taken from the surface of the building. Microscopic photographs of the patina or the 'natural biofilm' on the house were projected live onto the silos of Plangen mill. In the attached exhibition spaces of the Plange Mühle headquarters building, the BOOTSCHAFT project was presented in a solo exhibition. Project supported by the City Planning Department, Architekturbüro Ingenhoven and Architekturbüro Overdiek.



Sabine Kacunko, A view at her solo show in the BOOTSCHAFT-project room Kai 13 in 'Media Harbour' in Düsseldorf, 2006.

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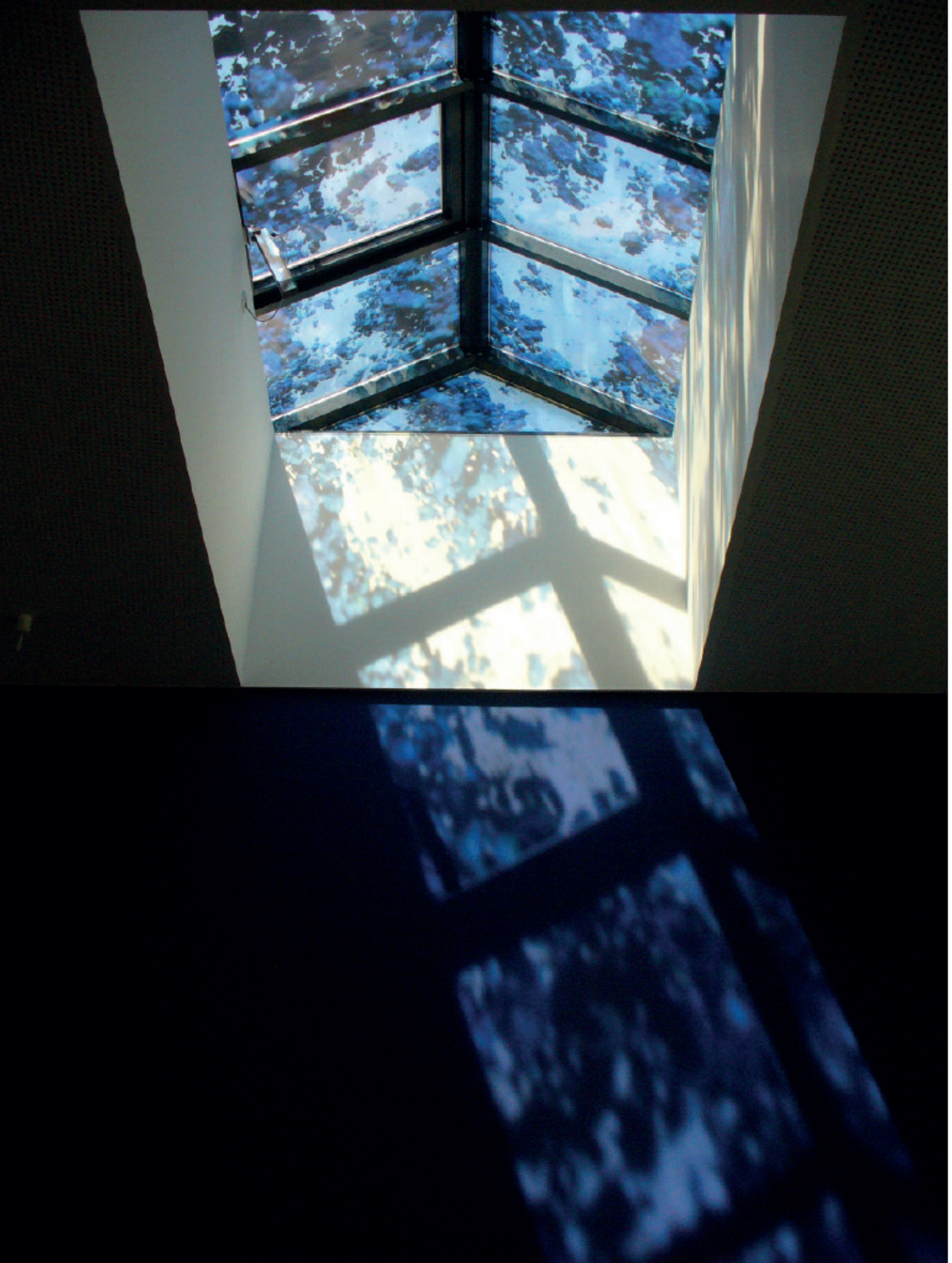
Sabine Kacunko, A view at her solo show in the BOOTSCHAFT-project room Kai 13 in ‘Media Harbour’ in Düsseldorf, 2006.

Sabine Kacunko

BOOTSCHAFT – Blue Window

(2006)

Permanent media installation, University of Osnabrück, in the foyer of the building at Kolpingstr. 7. Original occasion: *Downdate media art conference* (May 2006). Using a photomicroscope, microscopic photographs of a particle of patina from the outer surface of Osnabrück castle (which houses Osnabrück University lecture theatres) were digitized and printed on special film. This slightly translucent, weather-resistant foil was mounted on the skylight of the adjacent university building. The window lights the foyer above the stairs leading to the hall where the *Downdate media art conference* was held. Supported by the University of Osnabrück, 3M, Nikon.



Sabine Kacunko

Kosmische Pflanzentiere [Cosmic plant-animals]

(2004)

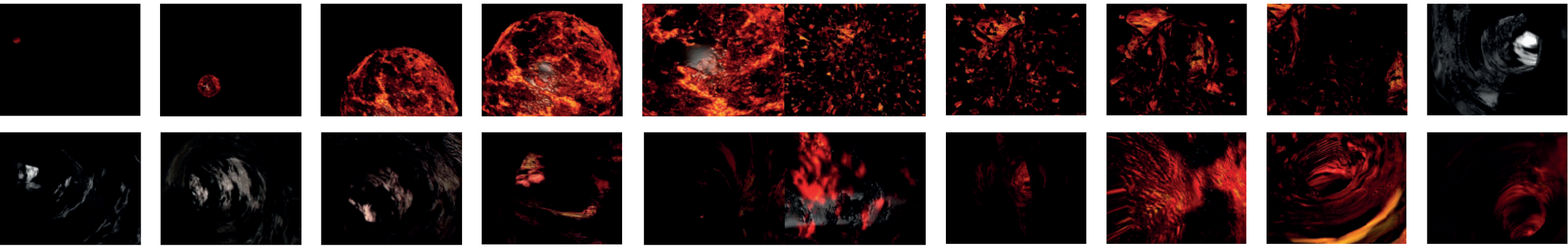
A view at the solo exhibition in the project space *art is different*, Düsseldorf (2004). The installation consisted of a 3D computer animation, a photograph, microscope, a negative populated with bacteria and other microorganisms, wood, felt.

a symbiosis in the system is at war
the tigger is deficient self-suport

multiplication has ceased to function
complete individuals are dying out

the spirit is no longer identifiable
the goal no longer resides in itself

a life draws to a close sk, 2003



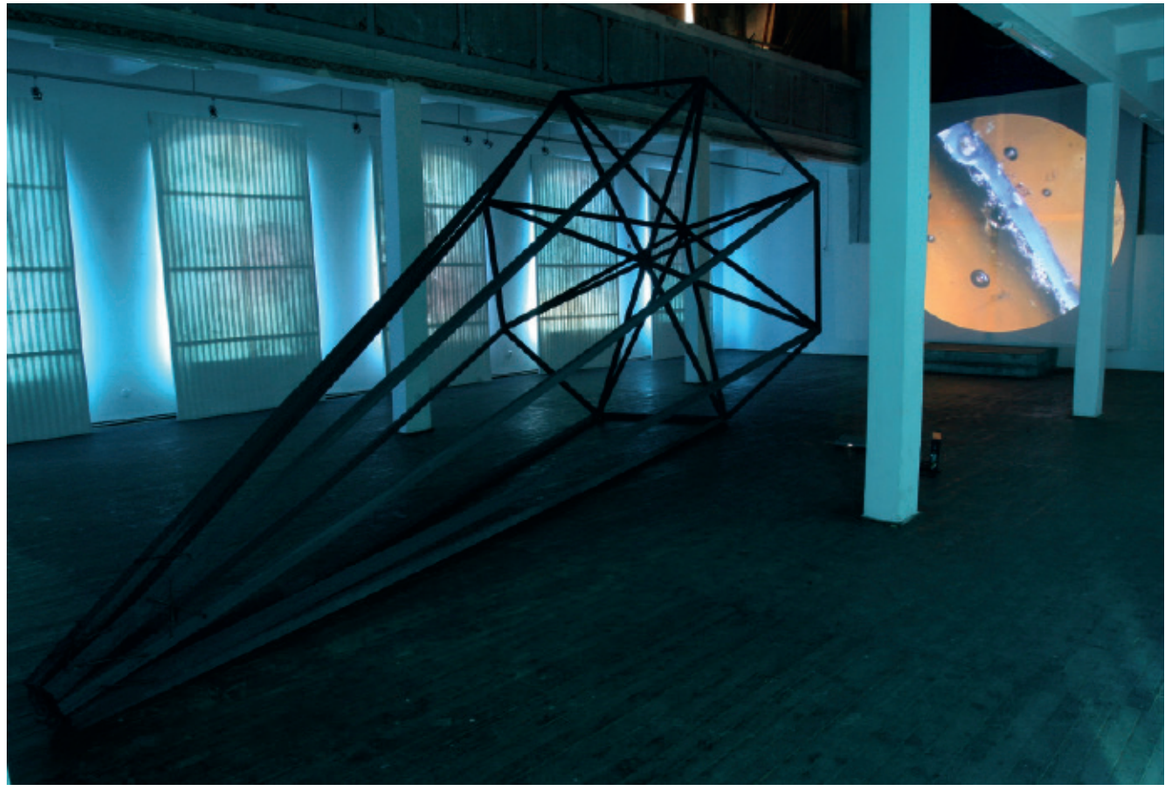
Sabine Kacunko

BOOTSCHAFT – Tempest on the Sea

(2006)

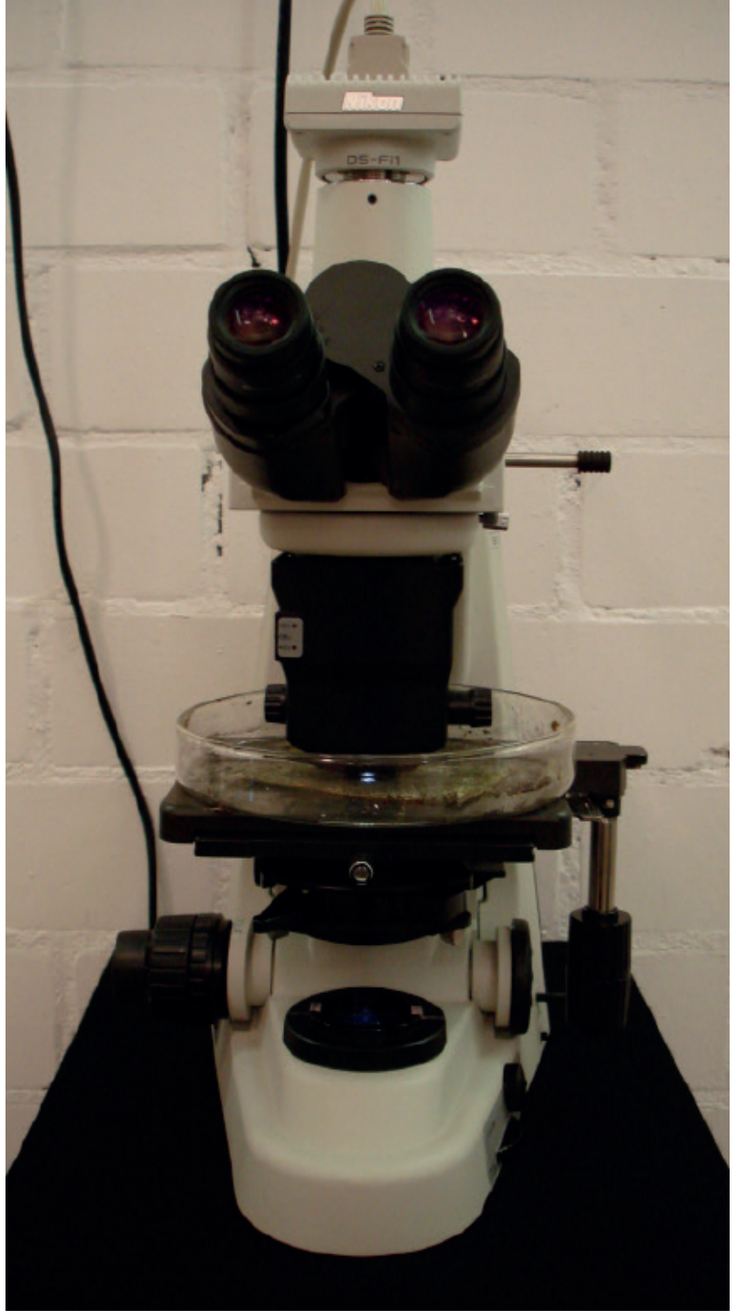
Interactive light installation, Cluj, Romania. Occasion: celebration of the 30th anniversary of the twinning of Cluj (formerly Klausenburg) and Cologne. Location: Transit Foundation/unnamed synagogue and *European Atrium*, University of Arts and Design, Cluj. The microbes from the patina of a glass fragment from a window at the Abbey of St Cecilia, Cologne, were the source for the media installation, *Tempest on the Sea*. The glass fragment is held today at the Cologne Cathedral Archives. The video image was projected onto the altar wall in the synagogue, and accompanied by the real-time transmission of the sound of the Somesul Mic River that flows through the city. At the centre of the space lay the *BOOTSCHAFT* primal anchor. In front of the windows, large-format white canvases were displayed, reflecting the colours of the video animation.

Project supported by Culture Office Cologne; University of Arts and Design at Cluj. It was complemented with contributions in situ by Liviana Dan, Curator at Brukenthalmuseum Hermannstadt, Professor Barbara Schock-Werner, master builder at Cologne Cathedral, and Dr. Dr. h.c. Christoph Machat, Vice-President of ICOMOS (The International Council on Monuments and Sites), Germany.



Sabine Kacunko
P.O.L. ART – Product life
(2008)

Occasion: Exhibition *Wa(h)re Kunst*. Concentart, Berlin-Kreuzberg.



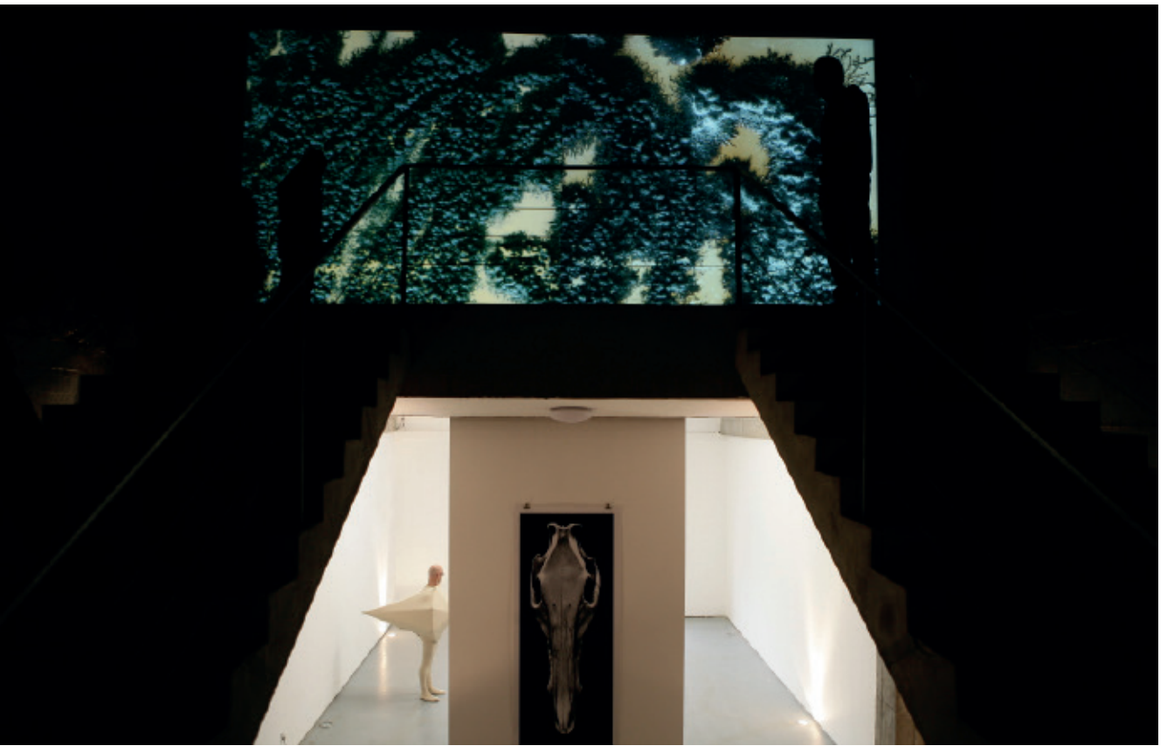
Sabine Kacunko
HAN HAI [Dry Sea]
(2009)

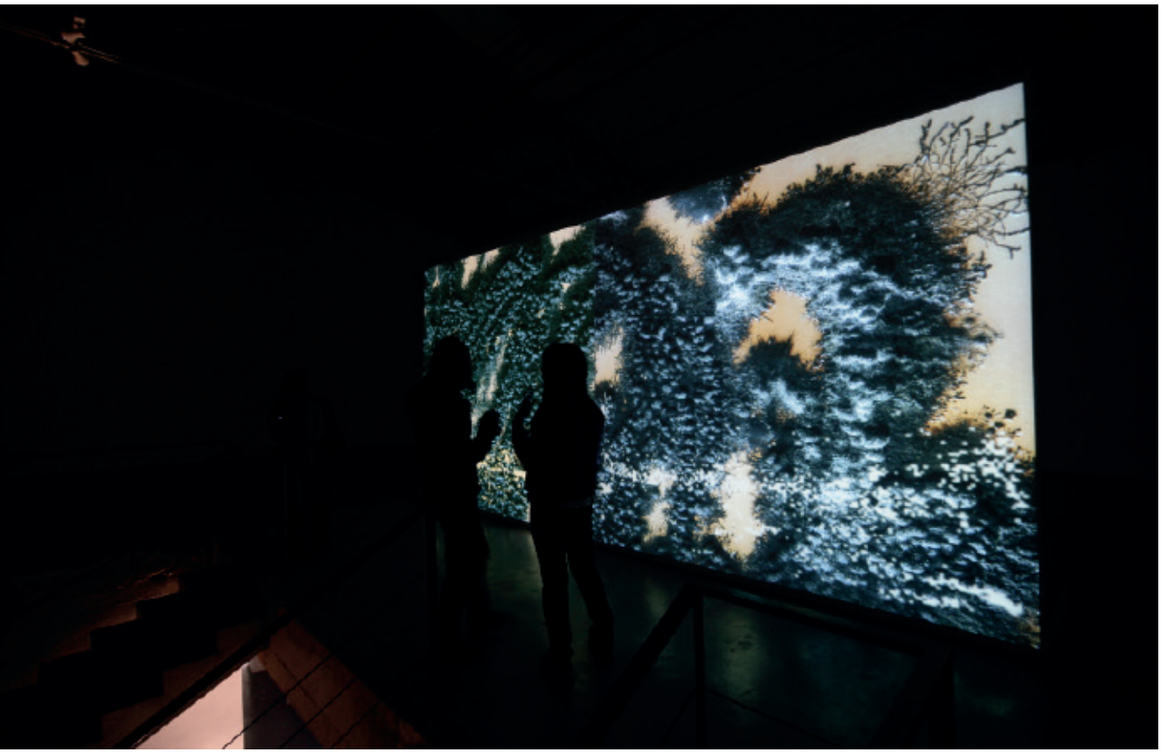
Interactive installation, Platform China Contemporary Art Institute, Beijing, China. For *Dry Sea*, Sabine Kacunko took microscopic photographs of fungal cultures from the Gobi Desert. These image data became the resource for the interactive environment, in which the microcosm of the desert patina was projected onto a screen and was visible across the entire screen area as the exhibition opened. The more visitors entered the space, the more the image on the screen fragmented, until it was no longer visible. The connections and thought-provoking impulses engendered by the work reflect the sensitive ecological and economic equilibrium the world is in, and which need to be preserved, or restored, as the case may be. Project supported by State Chancellery Berlin, Federal Institute for Materials Research and Testing, Berlin (BAM), University of Applied Sciences Potsdam, Charité Berlin, Nikon Deutschland and Panasonic Deutschland.

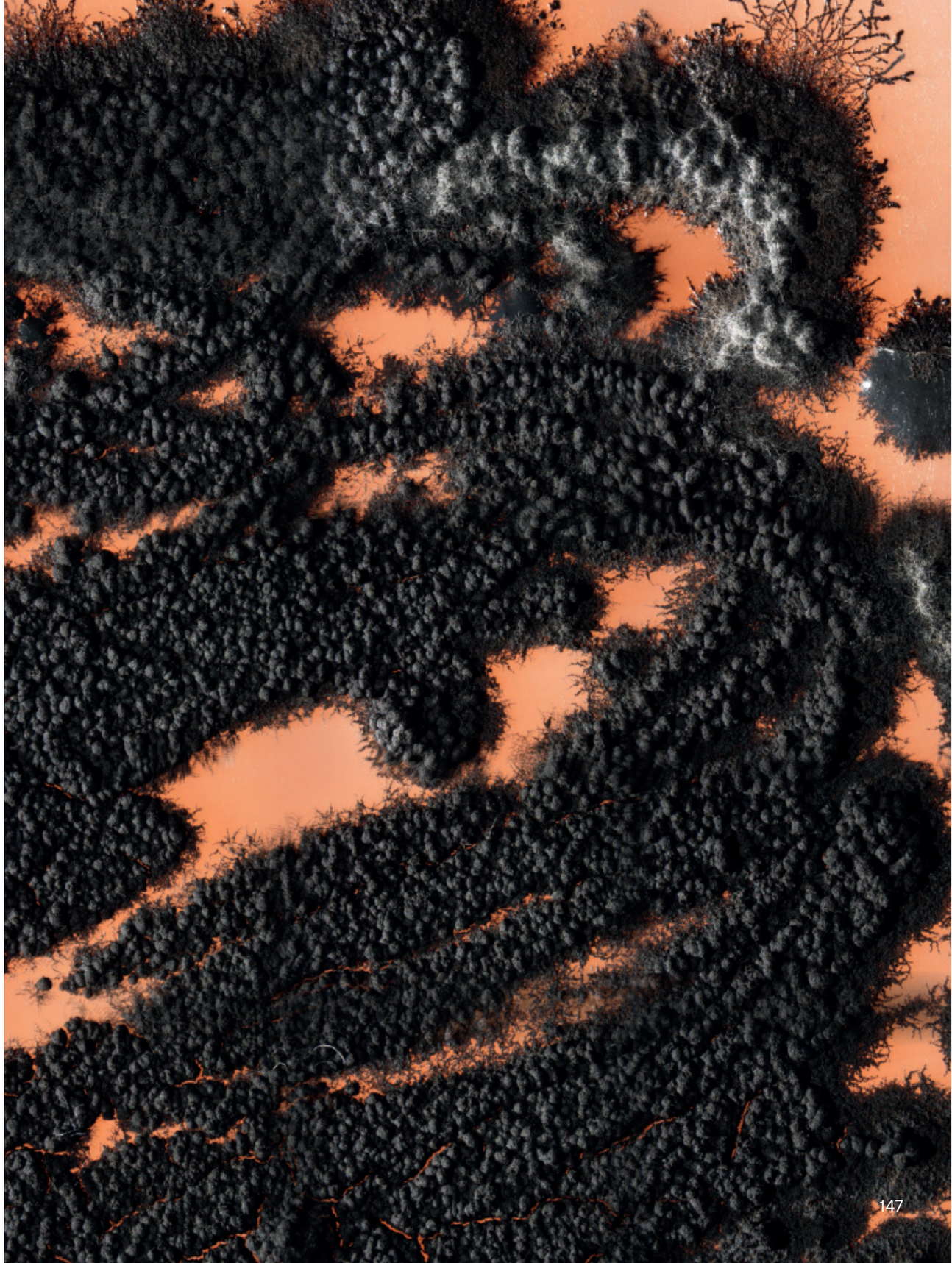
In the foreground of the piece stood the efforts to create a synthesis of economic growth and environmental protection as a challenge for the 21st century. In many countries of the world, man is witness to at least partly self-caused desertification, which is greatly accelerated by the destruction of the desert patina. The patina represents chemical weathering processes and is also known as desert varnish. It holds not only the desert sand together (by surface sealing), but also feeds other ecosystems such as rainforests. This happens while the microorganisms are transported through the air. The expansion of the Gobi Desert and the efforts to limit it through protective plantations (project ‘China Green Wall’) reflect a process that is about to become part of global consciousness. For more details cf. Scheuermann 2009.

The focus of the interactive piece is the artistic attempt to draw attention to the issue of desertification. Desert patina (fungi and lichens) from the Gobi Desert, were placed on a medium (*agar*) and cultured in the Berlin Federal Institute for Materials Research and Testing (BAM) by Professor Anna Gorbushina. Using a photomicroscope, digital image data from the desert patina were created and selected by the artist, to be used as raw material for the interactive installation. In a rear projection screen of 220 x 600 cm, the microcosm of the desert patina was made visible thanks to its proportions in the gallery space. Via a touchscreen, visitors can get more information on the subject. A desert landscape is created in urban space: on arrival, the first visitor can see a seemingly black and grayish desert patina on both sides on the projecting surface. However, the more people enter the room, the more the patina recedes, so that ‘the images of patina’ progressively vanish. The visitor is registered by a camera as it moves ‘behind’ the screen. This information is passed on to a computer while software created especially for this installation produces the effect described. The software was programmed in collaboration with the students Lino Teuteberg and Christoph Steinlehner from the University of Applied Sciences (FH) Potsdam (interface design).

Sabine Kacunko, *Living Sculpture* (2009). Performance; script by Sabine Kacunko, performed by Patrick Jambon. The shape of the ‘living sculpture’ was developed out of the coordinates of a regular octagon and is the core object or fundamental anchor of the *BOOTSCHAFT* project since its foundation in 2005. On the occasion of a solo show at Platform China Contemporary Art Institute, the *Uranker* [*Primal anchor*] moved out of the gallery spaces, into the public space in Beijing. 13.–15.10.2009.








HAN HAI
HAN HAI
紫禁轩画廊
PAN & WEI GALLERY
零度空间画廊
中美当代洗浴中心
叶永青艺术工作室


草场地文化产业区
CAO CHANG DI Cultural industry


灰灰米线

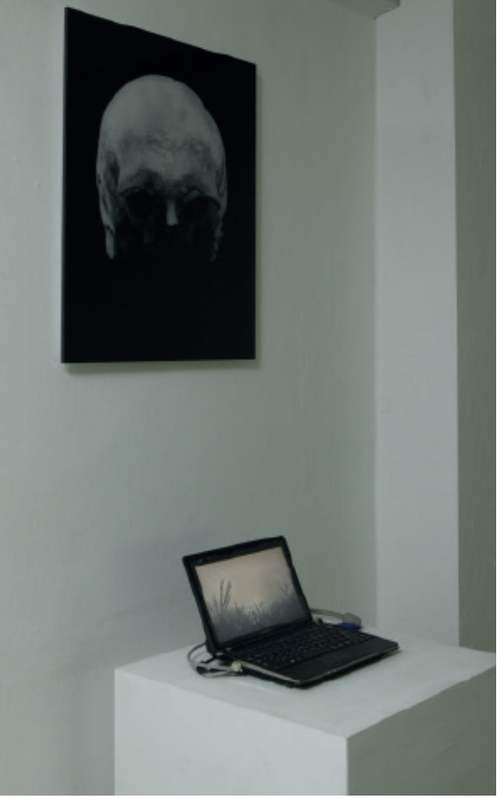
Sabine Kacunko
Vision
(2009)

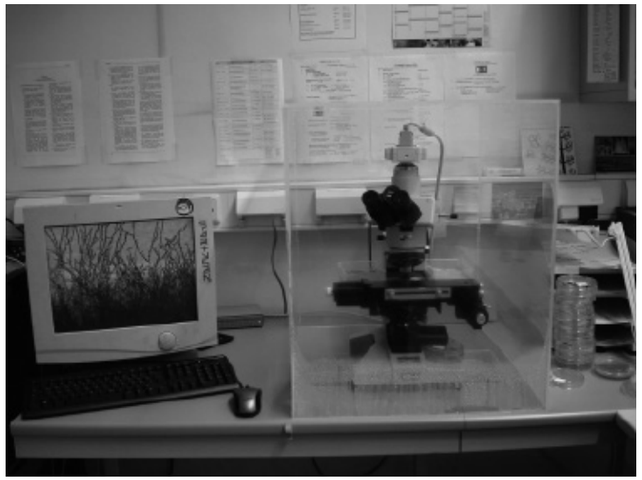
Closed circuit installation at the Total Museum of Contemporary Art, Seoul, Korea. Occasion: Exhibition Organ Mix (18.9.–11.11.2009).

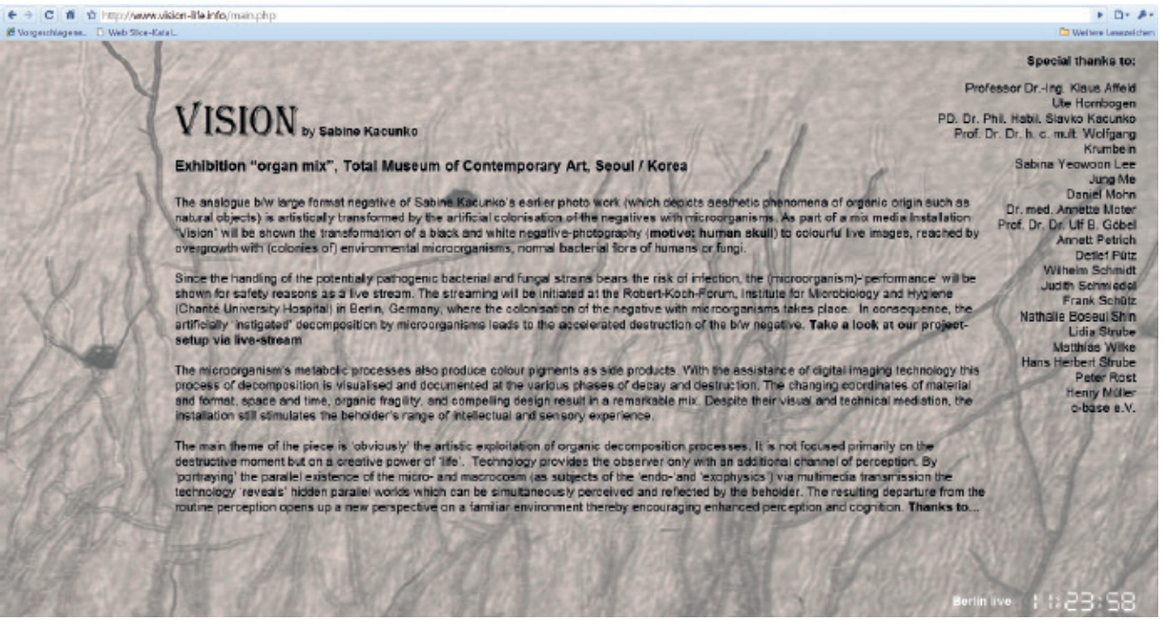
The analogue black-and-white large-format negative of Sabine Kacunko's earlier photographic work (which depict aesthetic phenomena of organic origin such as natural objects) is artistically transformed by the artificial colonization of the negatives by microorganisms. The transformation of a black-and white-negative (subject: a human skull) by the pathogenic bacteria colonies to colourfully live images was a part of a mixed media installation. Since the transfer of the pathogenic bacteria colonies brings the danger of infection with it, the bacteria 'performance' was shown for safety reasons as a live stream. The streaming has been initiated at the Robert-Koch-Forum, Institute for Microbiology and Hygiene (Charité University Hospital) in Berlin, Germany, where the artificial colonization of the negatives with microorganisms took place. This had the consequence that the artificially 'instigated' bacterial decomposition led to the premature destruction of the black-and-white negatives. The microorganism metabolic processes also produced the waste product of colour pigments. With the assistance of digital imaging technology, this process of decomposition was visualized and documented at various phases of decay and destruction. The changing coordinates of material and format, space and time, organic fragility and compelling design resulted in a remarkable aesthetic–epistemological mix. Despite its visual and technical mediation, the installation still stimulated the viewer's range of intellectual and sensory experience.

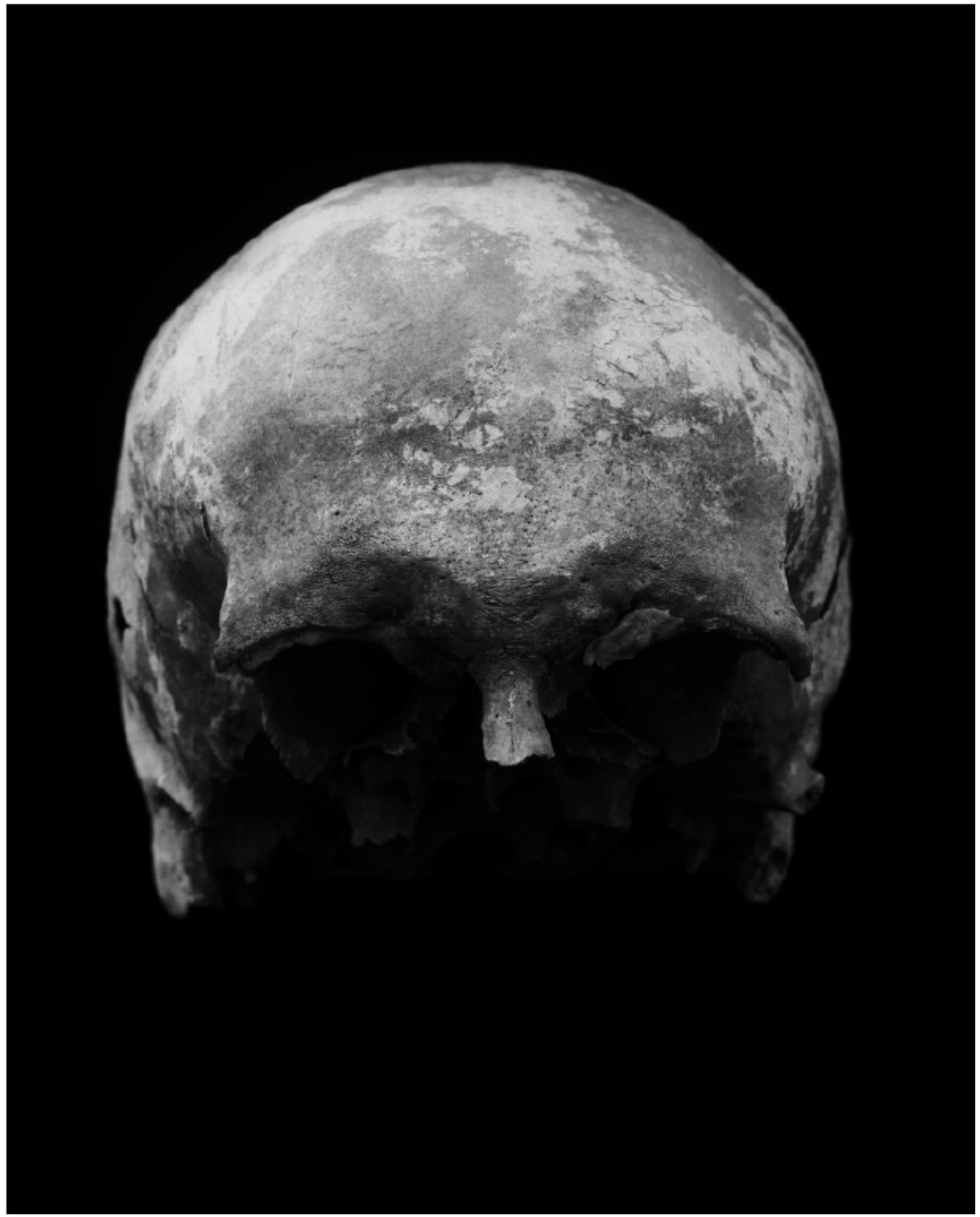
For safety reasons (since in the settlement of the negative the pathogenic microorganisms was involved) the laboratory of the Institute of Microbiology and Hygiene, Charité University medicine in Berlin (CCM, Dorotheenstr. 96) was chosen as the site where the settlement of the negative took place, with gratefully received assistance from Annette Moter and her team.

The main theme of this piece was the artistic exploitation of organic decomposition processes. It was not focused primarily on the destructive moment, but on a creative power of 'life'. Technology provided the observer only with an additional channel of perception. By 'portraying' the parallel existence of the micro- and macrocosms (as subjects of 'endo-' and 'exophysics') via multimedia technology the technology 'reveals' hidden parallel worlds which can be simultaneously perceived and reflected by the beholder. The resulting departure from routine perception opens up a new perspective on a familiar environment, thereby encouraging enhanced perception and cognition.






VISION by Sabine Kacunko
Exhibition "organ mix", Total Museum of Contemporary Art, Seoul / Korea
The analogue b/w large format negative of Sabine Kacunko's earlier photo work (which depicts aesthetic phenomena of organic origin such as natural objects) is artistically transformed by the artificial colonisation of the negatives with microorganisms. As part of a mix media installation 'Vision' will be shown the transformation of a black and white negative-photography (motive: human skull) to colourful live images, reached by overgrowth with (colonies of) environmental microorganisms, normal bacterial flora of humans or fungi.
Since the handling of the potentially pathogenic bacterial and fungal strains bears the risk of infection, the (microorganism)-performance will be shown for safety reasons as a live stream. The streaming will be initiated at the Robert-Koch-Forum, Institute for Microbiology and Hygiene (Charité University Hospital) in Berlin, Germany, where the colonisation of the negative with microorganisms takes place. In consequence, the artificially 'instigated' decomposition by microorganisms leads to the accelerated destruction of the b/w negative. Take a look at our project-setup via live-stream
The microorganism's metabolic processes also produce colour pigments as side products. With the assistance of digital imaging technology this process of decomposition is visualised and documented at the various phases of decay and destruction. The changing coordinates of material and format, space and time, organic fragility, and compelling design result in a remarkable mix. Despite their visual and technical mediation, the installation still stimulates the beholder's range of intellectual and sensory experience.
The main theme of the piece is 'obviously' the artistic exploitation of organic decomposition processes. It is not focused primarily on the destructive moment but on a creative power of 'life'. Technology provides the observer only with an additional channel of perception. By 'portraying' the parallel existence of the micro- and macrocosm (as subjects of the 'endo-'and 'exophysics') via multimedia transmission the technology 'reveals' hidden parallel worlds which can be simultaneously perceived and reflected by the beholder. The resulting departure from the routine perception opens up a new perspective on a familiar environment thereby encouraging enhanced perception and cognition. Thanks to...
Special thanks to:
Professor Dr.-Ing. Klaus Affeld
Ute Hornbogen
PD. Dr. Phil. Habil. Slavko Kacunko
Prof. Dr. Dr. h. c. mult. Wolfgang Krumbein
Sabina Yeowoon Lee
Jung Me
Daniel Mohn
Dr. med. Annette Moter
Prof. Dr. Dr. Ulf B. Göbel
Annett Petrich
Detlef Pütz
Wilhelm Schmidt
Judith Schmiedel
Frank Schütz
Nathalie Boseul Shin
Lidia Strube
Matthias Wilke
Hans Herbert Strube
Peter Rost
Henry Müller
c-base e.V.
Berlin live



Prof. Wolfgang E. Krumbein at the Charité in Berlin in 2009.

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wek@uni-oldenburg.de
WebSite: www.biogema.de

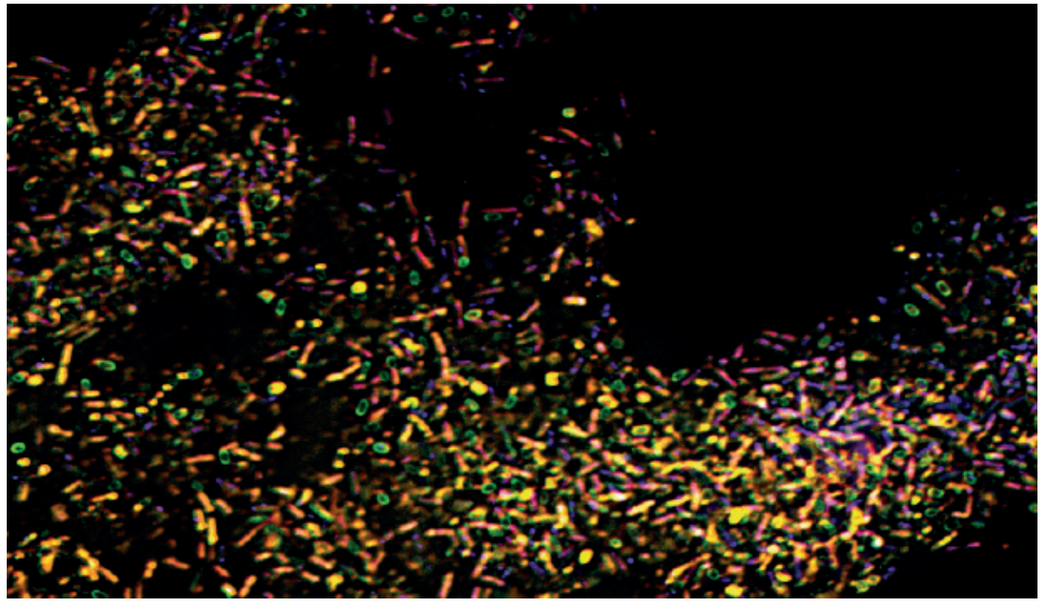
Als Mitglied von ICOMOS, Gutachter für die Akropolis-Monumente in Athen und Begründer der Biopatinaforschung stelle ich fest, dass das Projekt BOOTSCHAFT der genialen Schwarz-Weiss-Fotografin und Videokünstlerin Sabine Kacunko den Finger an den Zahn der Zeit legt. Ihr PATINA-PROJEKT ist zukunftsweisend und vergangenheitsbezogen. Staub der Jahrtausende kreist um die Erde, legt sich nieder auf Monumente und Kunstobjekte, auf Lebendes und Verstorbenes, dahin Gegangenes. Der Staub aber enthält Leben und Lebensgeschichte und lagert sich in dünnen Schichten auf die irdischen Objekte. Es gelingt KACUNKO auf erstaunlich elegante Weise, die Farben, Bilder und Töne die den Erdball umkreisen mit ihren Medieninstallationen nicht nur als Foto einzufrieren, sondern mehr noch mit dem Betrachter auf elektronischem Wege zu verbinden. Unser Projekt erinnert an die Honigpumpe und das Erdtelefon von Joseph Beuys. Es handelt sich um eine unterirdische Hypnose, die den Betrachter erfasst und vom Betrachter im Gegenzug modifiziert wird. Die apalogen Speicher der Vergangenheit werden digitalisiert und visualisiert. Die allgegenwärtigen Mikroben, die den Zahn der Zeit darstellen, alles verzehrend, alles farblich in Patinaionen verfremdend, werden über Mikroskope und Computertechniken in die Wahrnehmungshorizonte des Betrachters gezogen. In einem Wort: Dieses künstlerische Projekt ist nicht postmodern, es ist ein Produkt der Zeit, ein Wegweiser durch das 21. Jahrhundert.

Berlin, 09.07.09

(Wolfgang Elisabeth Krumbein)

Wolfgang E. Krumbein, a recommendation-statement on Sabine Kacunko's *BOOTSCHAFT*-project (9. 7. 2009).

Sabine Kacunko
Life Flag – News from Everywhere
(2010)



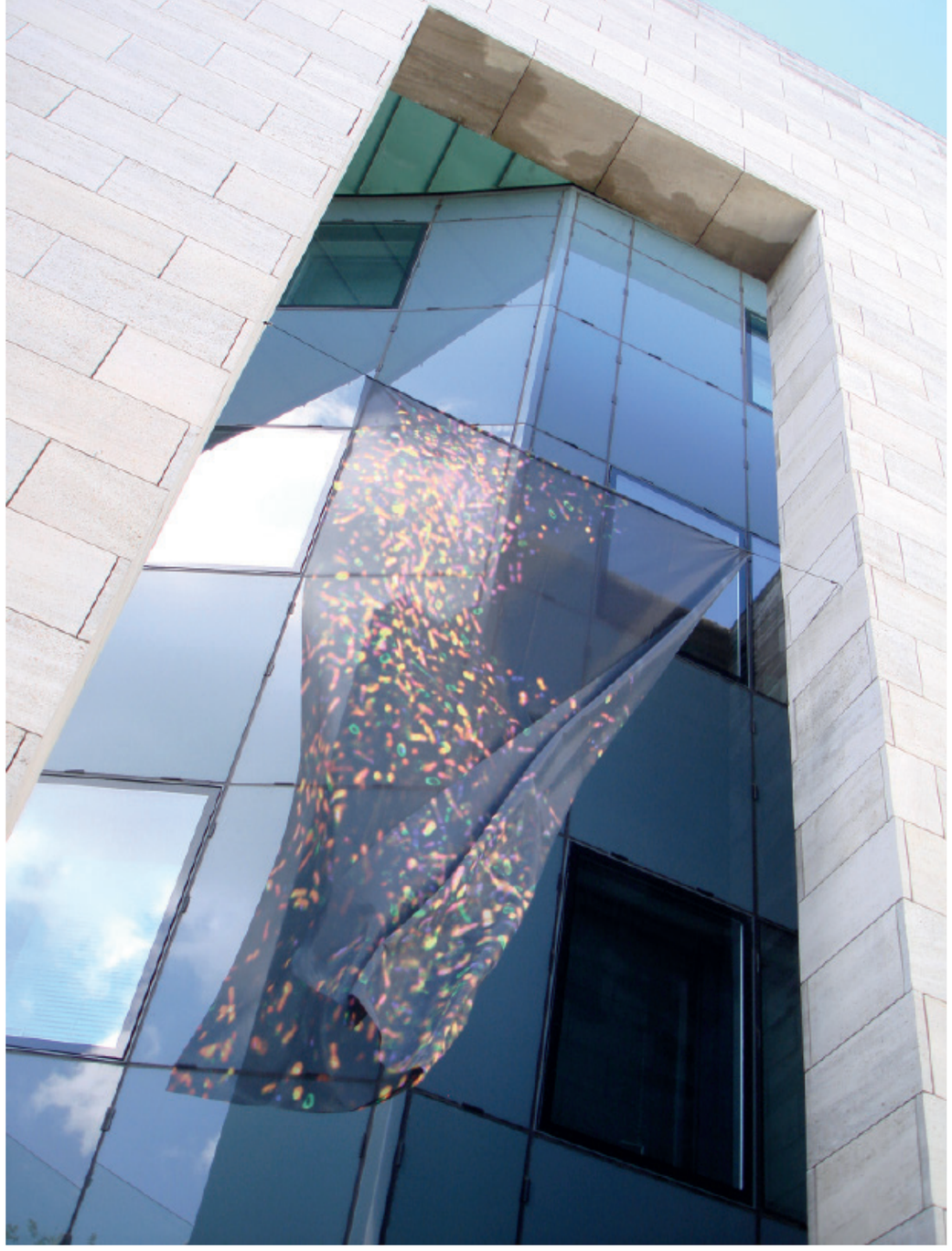
Project in diverse public spaces in Berlin (2010). Screenshot from the project website. *Life Flag* was an official project of the UNESCO Year for the Rapprochement of Cultures. It is being realized in co-operation with Charité Berlin, the Humboldt University, the Free University, the Berlin-Brandenburg Academy of Sciences and Humanities, the Federal Institute for Material Research and Testing and the Prussian Cultural Heritage Foundation. The project was supported by Schering Foundation. Opening ceremony in the Robert Koch Hall on 8 October. Historically, the Robert Koch Forum is one of the most significant places of science in Berlin. Here, the concept of interdisciplinarity has always been a major focus and the cooperation between scientists has led to some of the most important discoveries of our times. Among other things, the Robert Koch Forum was the place where, for the first time, images and sound were used to illustrate scientific data. The humanist interplay between the disciplines, also taking into account modern technology, forms part of the conceptual background of Sabine Kacunko's art performance. The place, where Robert Koch presented the tuberculosis virus and thereby profoundly influenced modern microbiology, served as a communicative platform. Humboldt's Philharmonic Chorus, conducted by Professor Constantin Alex, presented the sound performance 'Chorus Oceanobacillus Pulvirenatus', which transformed the scientific data of the ribosomal sequence into an aesthetic body of sound. Irina Urusova, Russian student of agricultural sciences at Humboldt University performed the *Life Flag* anthem 'Hymnus Oceanobacillus Pulvirenatus'. The latter was composed especially for *Life Flag – News from Everywhere* by Ari Benjamin Meyers, while the sound performance was designed in cooperation with Sabine Kacunko.

Alexander von Humboldt's dust sample from the Ehrenberg Collection, Berlin: In 1823 in Paris, Alexander von Humboldt received a little tube of 'cosmic dust', which was collected in Calabria, Italy. Later, he passed it on to Florens Chladni and today it is stored in the Museum of Natural Sciences in Berlin as part of the Ehrenberg Collection. As later discovered from further examination, the tube does not contain 'cosmic', but red-stained Sahara dust. In cooperation with the Institute of Microbiology and Hygiene – Charité University Medicine (head at the time Professor Dr Ulf Göbel) the theme of the flag was developed with the support of team Moter. Ribosomes were stained, using molecular biology methods. This way, ribosomal sequences were made visible. The extraordinary aspect is that ribosomal sequences can be found within life forms such as bacteria, plants and animals as well as human beings. Consequently, the conceptual focus of the art performance was put on these ribosomes. A scientific sequence analysis brought to light a sequence of the 16S rRNA, which until then had not been identified. As initiator of the cooperation between sciences and the arts, Sabine Kacunko named this sequence 'Oceanobacillus pulvirenatus' – reborn from the dust.

The installation at the Schloßplatz, Berlin-Mitte: This is the place in the centre of Berlin where the new Humboldt Forum is being built and which, in this sense, functions as a symbol for Berlin's readiness to further immerse itself in interdisciplinary and intercultural dialogue. The virtual *Life Flag* moved freely as a 3D-animation in public space. The movement of the flag was calculated by software specially developed for the event. A computer processed the data of the wind coordinates, which were being transmitted live from participating countries.

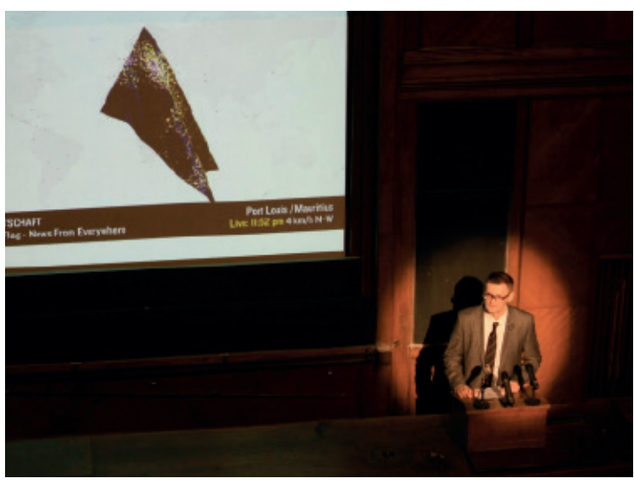
Life propagation installation, Martin Gropius Bau: For this project, Professor Dr Anna Gorbusina (Head of the department 'Materials and Environment' of the Federal Institute for Materials Research and Testing [BAM]) reactivated and reanimated microorganisms from a historic dust sample received by Alexander von Humboldt. As part of a global phenomenon, the desert dust was carried by winds from Africa to Europe. This way, Sahara dust reaches distant regions of the world. The minerals of the desert dust form an essential part of the nutrition of various ecosystems, such as the Amazonian rainforest or the oceans. On their way, the microorganisms that adhere to the dust particles support and influence the spatial and functional interaction of living creatures and biotopes of all the habitats where the dust settles.

Set-up of the experiment: a video microscope recording the cell cultures is installed on a table in the museum and connected to a computer. The growth of the bacteria is projected live onto the Martin Gropius Bau, which, due to building works, is currently surrounded by scaffolding. The elements that serve to remodel the façade of the building become part of the installation. The construction foil is used as projection screen for microscopic images of the living bacteria cultures. The light functions as a binder between the various layers of time, material and content. This way, past, present and future are 'put on top of` or penetrate each other. The projection showed bacteria as though they actually 'communicated' on the building. Sahara dust also reaches Berlin and has impact on the environment there. Thus, it was an element of the natural biofilm of the Martin Gropius Bau. The installation pointed out the interface between micro- and macrocosm and, at the same time, became a complex allegory for society. The reanimated bacteria cultures became a symbol of life itself – an existence independent of the limits and artificial laws of culture. Bacteria are the origin of life. They defy the limits between cultures and disciplines. By doing so, they highlight and emphasize plurality as the natural entity of life.



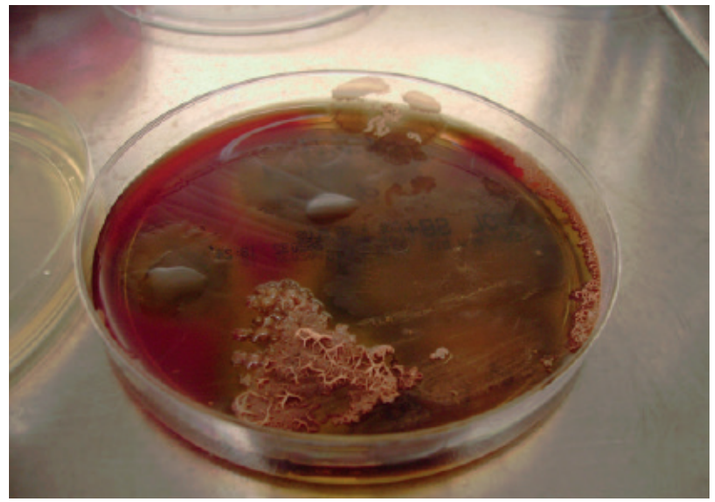

LA DINASTIA DE LOS INCAS
DEL PERU

Left: Sabine Kacunko, *Life Flag – News from Everywhere.* Project in diverse public spaces in Berlin (2010). Entrance to the famous Robert Koch Hall with Sabine Kacunko's b/w photograph of the human skull.
Right: Large poster in front of the Robert Koch Forum.



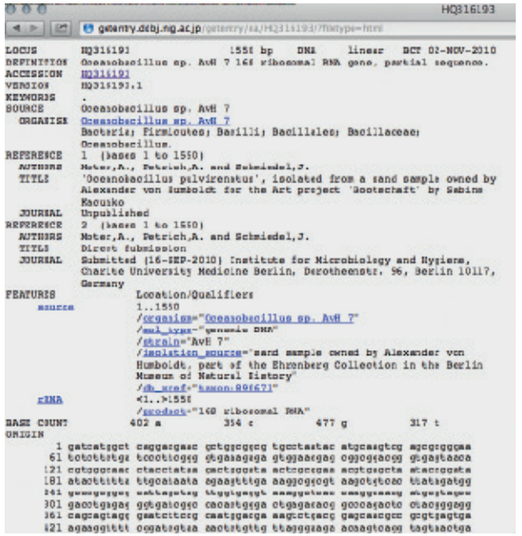
Top: Opening ceremony in the Robert Koch Hall on 8 October. Opening speech by Hermann Parzinger before the diplomatic reception and opening of the exhibition in the Robert Koch Forum.
Bottom left: Opening ceremony in the Robert Koch Hall, Robert Koch Forum on 8 October. Introductory speech by Hermann Parzinger.
Bottom right: Opening ceremony in the Robert Koch Hall, Robert Koch Forum on 8 October. Introductory speech by Slavko Kacunko.

A view in the exhibition at the Robert Koch Forum.



Petri-dish with the cultured Alexander von Humboldt's dust sample from the Ehrenberg Collection, Berlin.

Alexander von Humboldt's dust sample from the Ehrenberg Collection, Berlin.



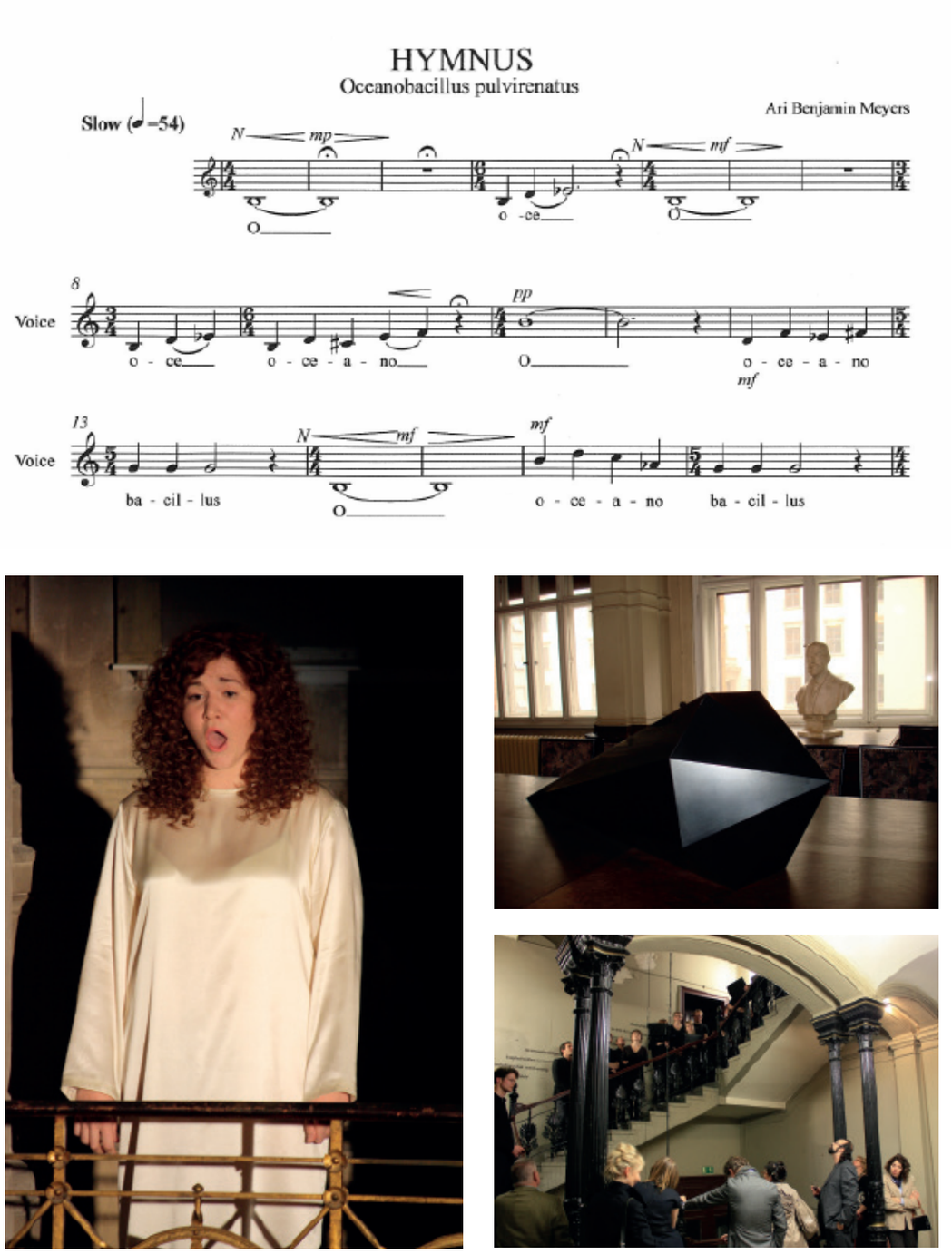
„Oceanobacillus pulvirenatus"
16S rRNA gene
partial sequence

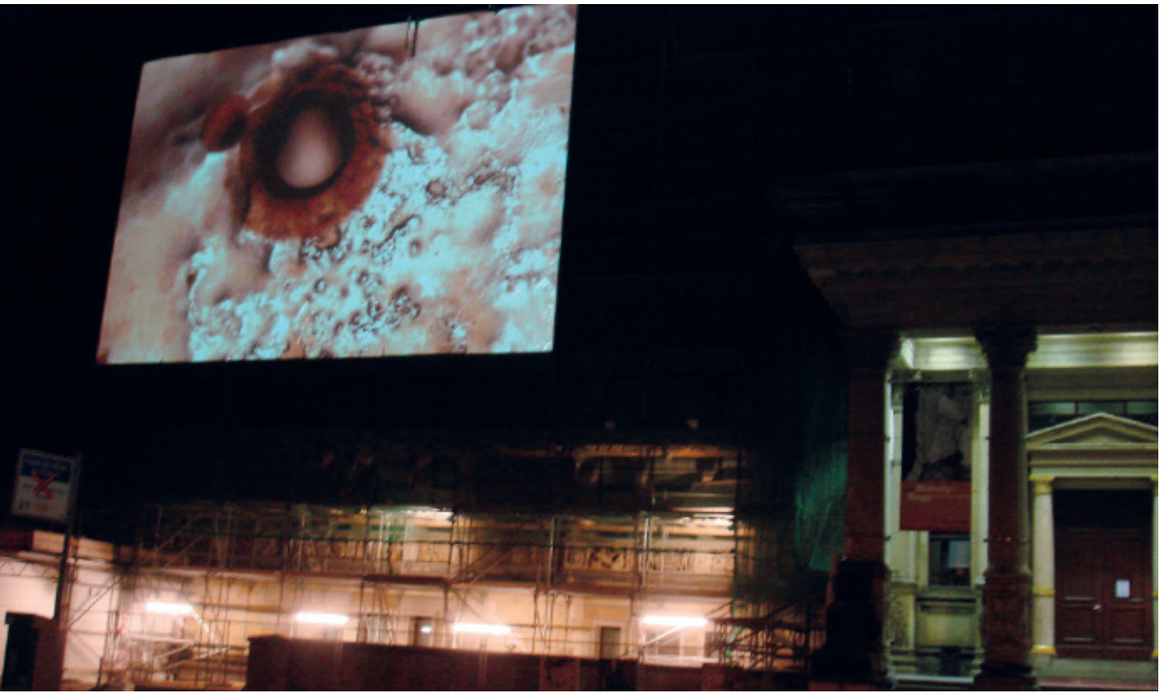
GGTGAGTAACACGTGGGCAACCTA
CCTATAAGACTGGGATAACTCGCG
GAAACGTGAGCTAATACCGGATAA
TACTTTTTATTGCATAATAAGAAG
TTTGAAAGGCGGCGTAAGCTGTCA
CTTATAGATGGGCCCGCGGCGCAT
TAGCTAGTTGGTGAGGTAAAGGCT
CACCAAGGCAACGATGCGTAGCCG
ACCTGAGAGGGTGATCGGCCACAC
TGGGACTGAGACACGGCCCAGACT
CCTACGGGAGGCAGCAGTAGGGAA
TCTTCCGCAATGGACGAAAGTCTG
ACGGAGCAACGCCGCGTGAGTGAA
GAAGGTTTTCGGATCGTAAAACTC
TGTTGTTAGGGAAGAACAAGTCAG
GTAGTAACTGACCTGACCTTGACG
GTACCTAACCAGAAAGCCACGGCT
AACTACGTGCCAGCAGCCGCGGTA
ATACGTAGGTGGCAAGCGTTGTCC
GGATTTATTGGGCGTAAAGCGCTC
GCAGGCGGTCTTTTAAGTCTGATG
TGAAAGCCCACGGCTTAACCGTGG
AGGGTCATTGGAAACTGGAGGACT
TGAGTGCAGAAGAGGAGAGTGGAA
TTCCATGTGTAGCGGTGAAATGCG
TAGAGATATGGAGGAACACCAGTG
GCGAAGGCGACTCTCTGGTCTGTA
ACTGACGCTGAGGAGCGAAAGCGT
GGGTAGCGTAACAGGATTAGATAC
CCTGGTAGTCCACGCCGTAAACGA
TGAGTGTCTAGGTGTTAGGGGGTT
TCCGCCC

The partial sequence of the 16S rRNA gene of an isolate of the Humboldt sand sample was obtained. The sequence was not identical with any of the currently available data from EMBL and GeneBank and had the highest homology to previously published *Oceanobacterium* spp.. We call this art project isolate provisionally "Oceanobacillus pulvirenatus", (pul'vi.re.na'tum: lat. m. pulvis dust. Part. Perf. Dep. (Akk. Sg. masc). renatus reborn)
We thank Prof. Dr. B. Schink (Universität Konstanz) for help with formation of the name of the new isolate.

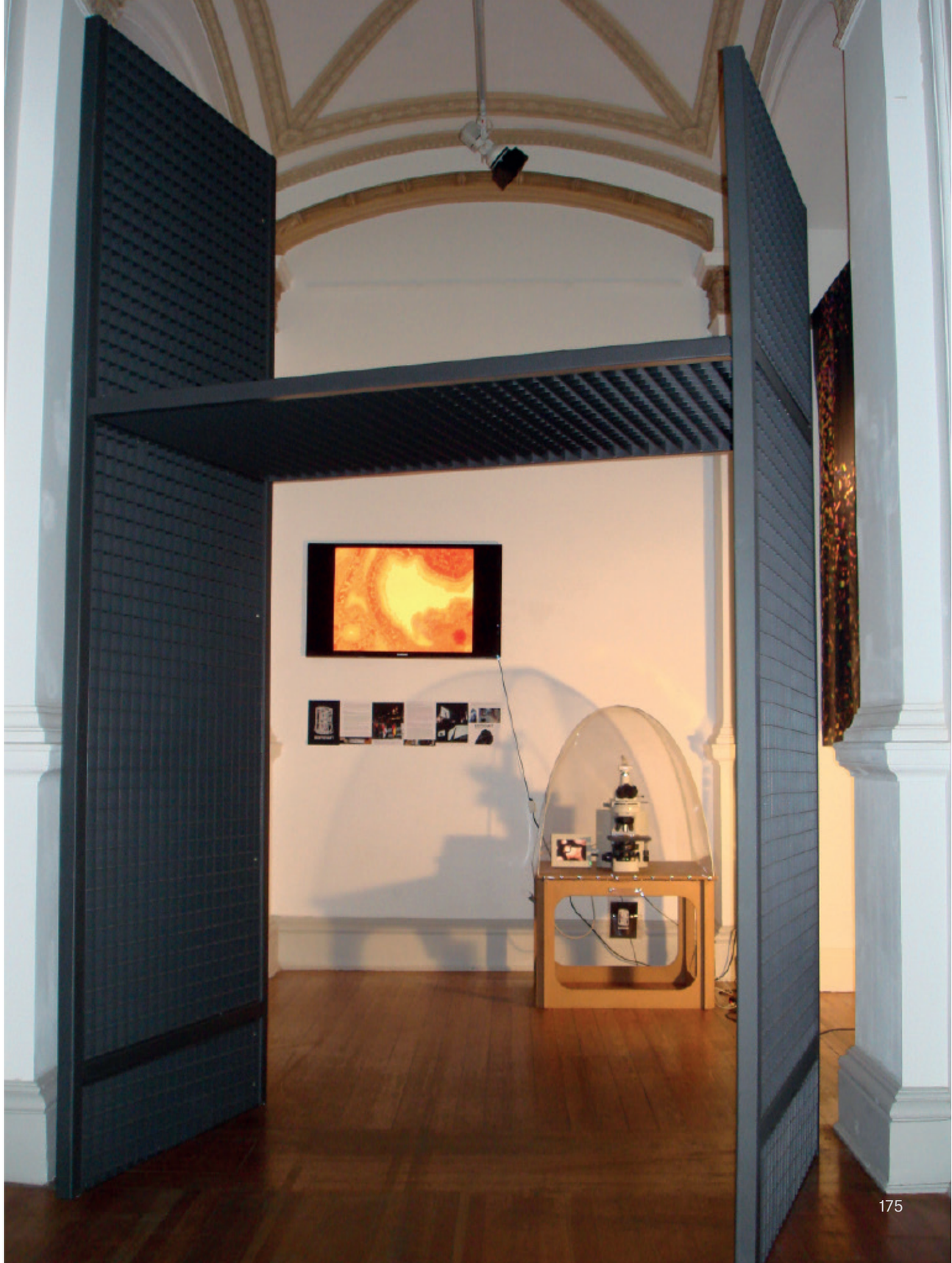
AG Meier, Institut für Mikrobiologie und Hygiene (head: Prof. Gibbel)

Right: Partial sequence of *Oceanobacillus Pulvirenatus*.
Top left: A proof of the registration of *Oceanobacillus Pulvirenatus*.
Bottom left*: Oceanobacillus Pulvirenatus* as a print of the drinking cups during the opening-event at the Robert Koch Forum.

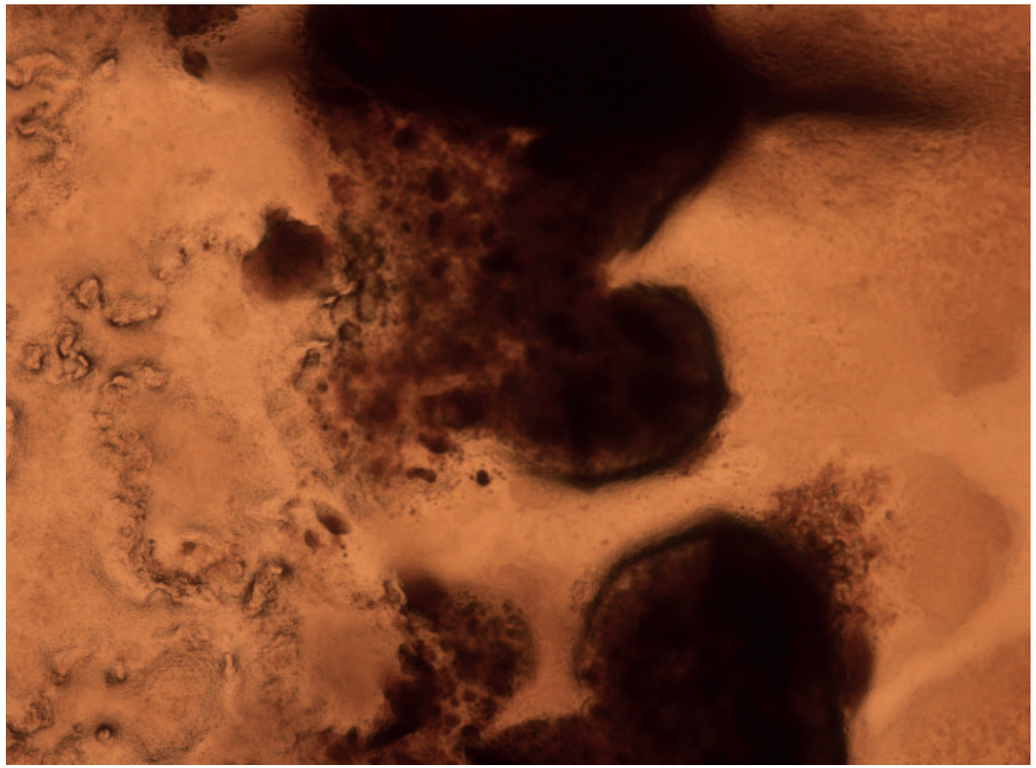

HYMNUS
Oceanobacillus pulvirenatus
Ari Benjamin Meyers
Slow (♩=54)
N mp
o -ce
N mf
O
8
Voice
o - ce
o - ce - a - no
O
pp
o - ce - a - no
mf
13
Voice
N mf
ba - cil - lus
O
mf
o - ce - a - no
ba - cil - lus



Top: The interactive virtual LIFE-FLAG at the Schloßplatz, Berlin-Mitte.
Bottom and right: *Life propagation* installation, Martin Gropius Bau.

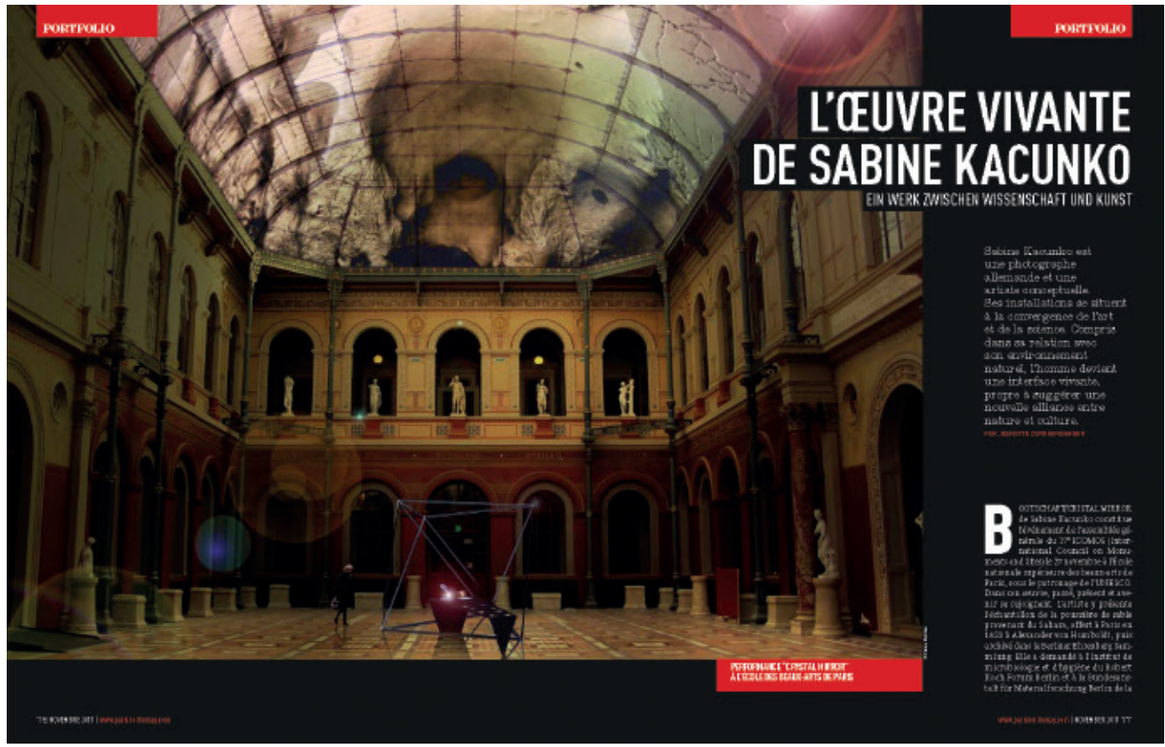


BOOTSCHAFT – Uranker [Primal Anchor] (2010). Sculpture. Occasion: *Life Flag* Project. Location: British Embassy, Berlin. The shape of the sculpture was developed from the coordinates of a regular octagon and is the core object identified with the *BOOTSCHAFT* project since its foundation in 2005.

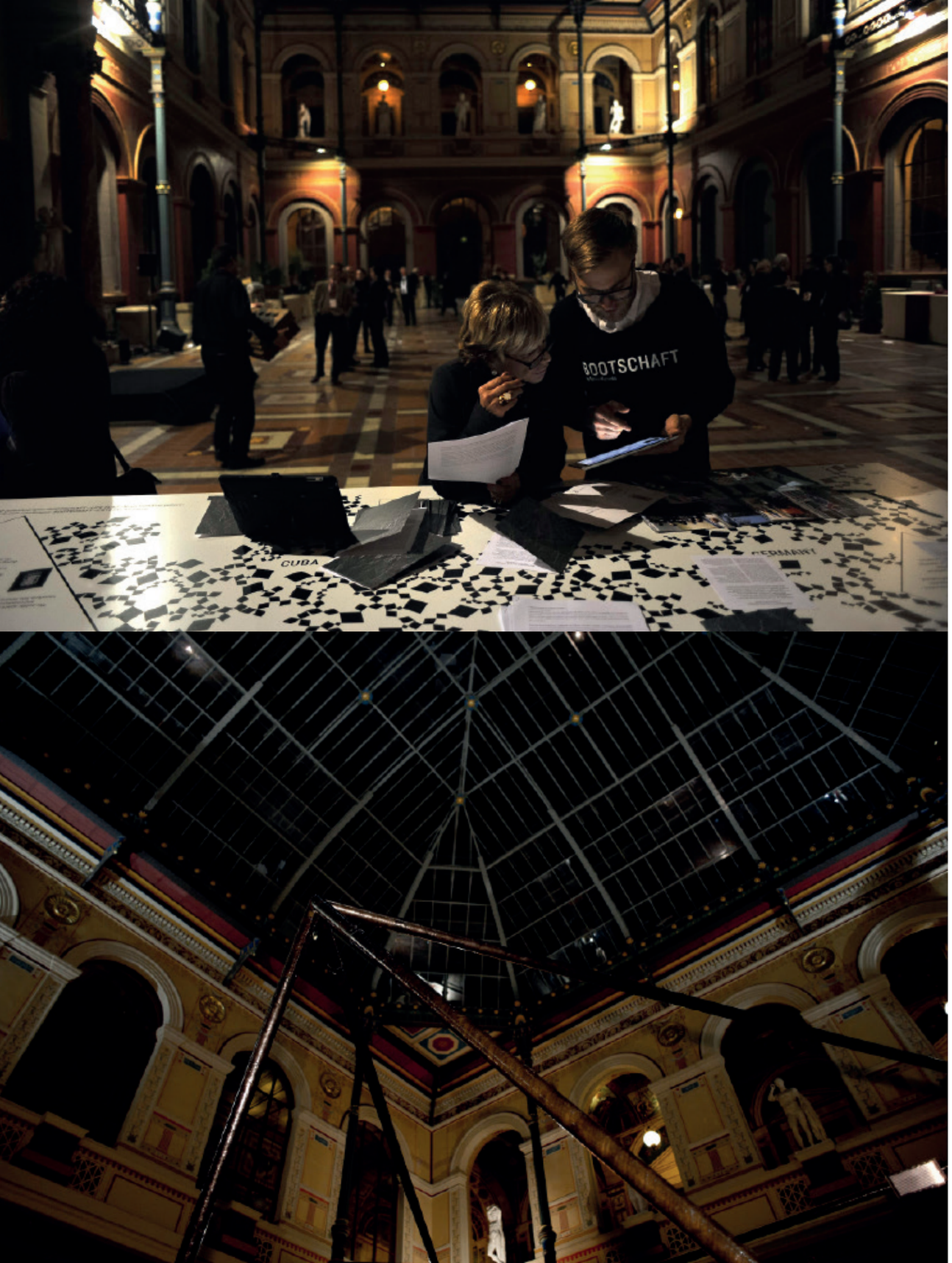


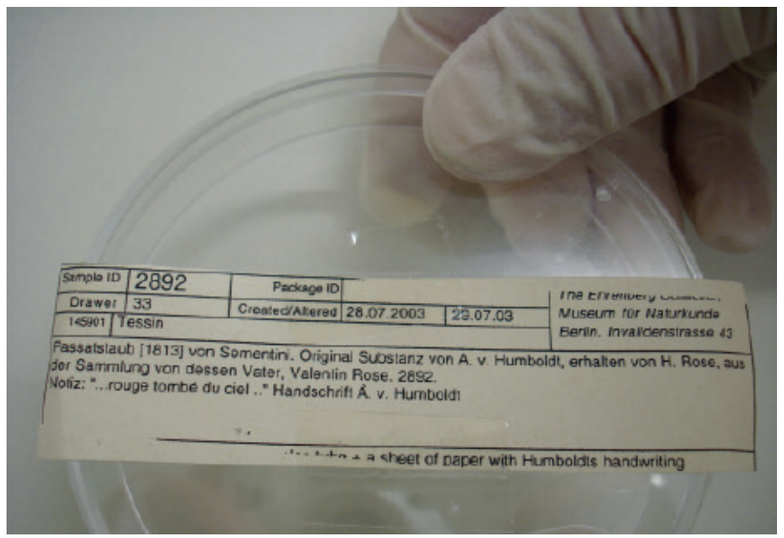
Top: Sabine Kacunko, microscopic image of the cultured Alexander von Humboldt's dust sample from the Ehrenberg Collection, Berlin.. Bottom left: Sabine Kacunko, *Life Flag – News from Everywhere.* The project served also as the opening event of the World Health Summit in Berlin (10.10.2010). Bottom Right: Introduction by Prof. Ganten.

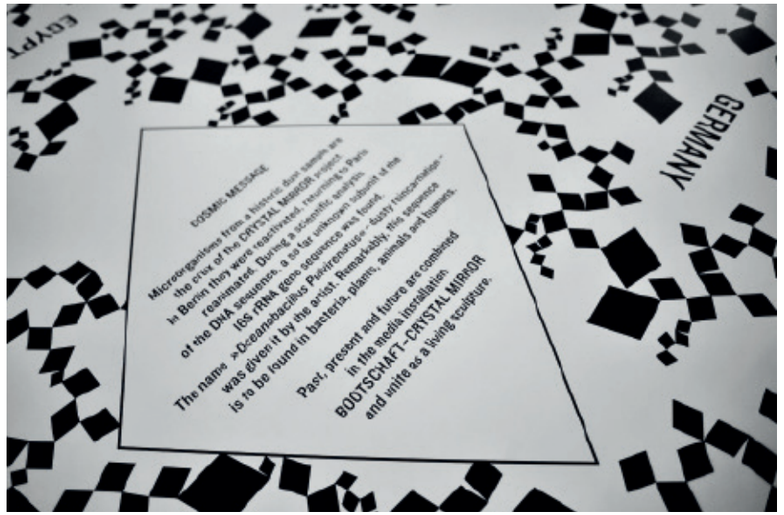
Sabine Kacunko
Crystal Mirror
Media sculpture, École nationale supérieure des Beaux-Arts de Paris (ENSBA)
(2011)



Sabine Kacunko, *Crystal Mirror*, the opening event of the ICOMOS conference on 27.11.2011. A press announcement for *L'oeuvre vivante de Sabine Kacunko.*


BOOTSCHAFT
CUDA





Sabine Kacunko
Looping Life
Collegium Hungaricum Berlin
(2013)

Façade with two projections. Visitors experienced live multimedia installations while these at the same time depicted the environmental influences present as microorganisms in the artist's own blood, which was in turn projected onto the façade of the CHBs building.

Façade with two projections: The particular video and audio footage reacted not just with each other but were actually linked to each other and where the delivery 'authentic sound structures' emerged, reminiscent of an urban landscape always in motion and mutation until the blood stops circulating. The window panes developed not only a membrane between the inner and outer areas which were projected on the window fronts of the building but also a timeslot in which the micro- and macrocosms met.

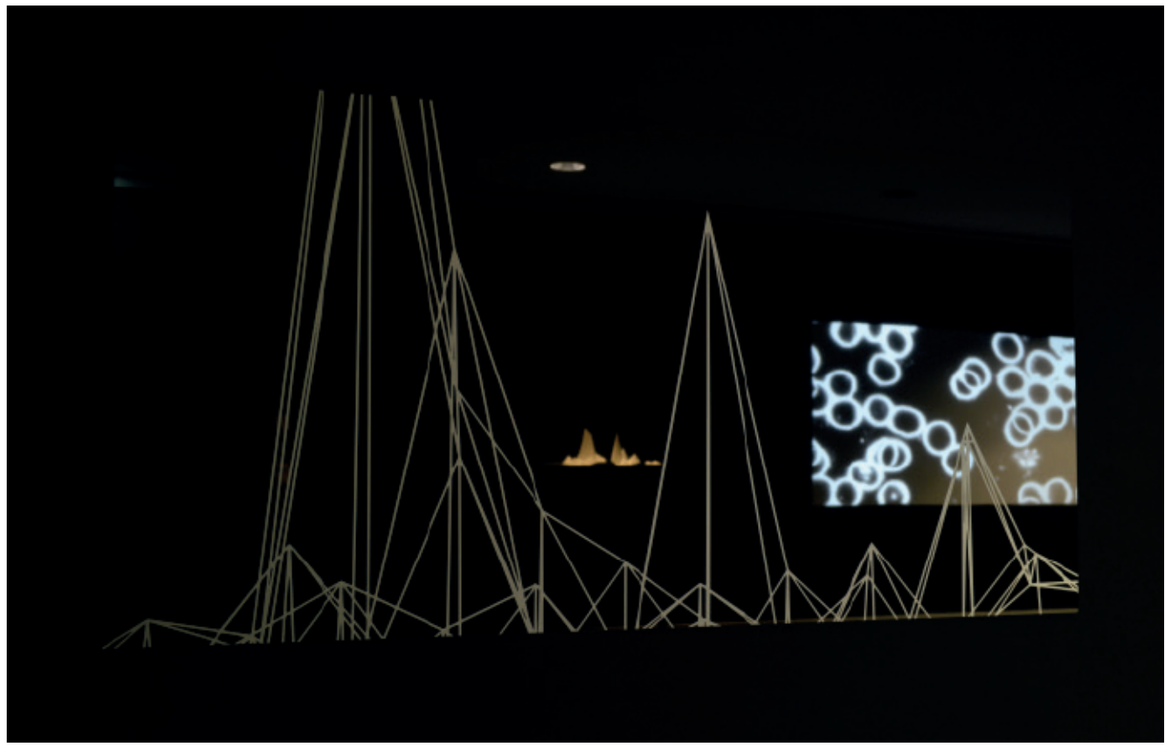
The main focus of the project was the media installation *Hit and Run*, which describes one of the two essential mechanisms for the courses of infection. On this occasion the artist placed a droplet of blood from her fingertip under a dark field microscopy using a video camera connected to a computer. This microscopic recording was visible using 2000x magnification with computer monitors and additional projection screens. During the performance the artist conducted blood tests with various substances. The reaction in the blood and the movement of minute particles of the symbionts were carried out by means of specially developed software, which was analysed in real time and transcribed at the same time both audibly and visually. The programming was implemented by RV realtime visions GmbH. The audio and sound was created with Dr Paul Modler, an academic professional for sound and acoustics at the University for Design in Karlsruhe.

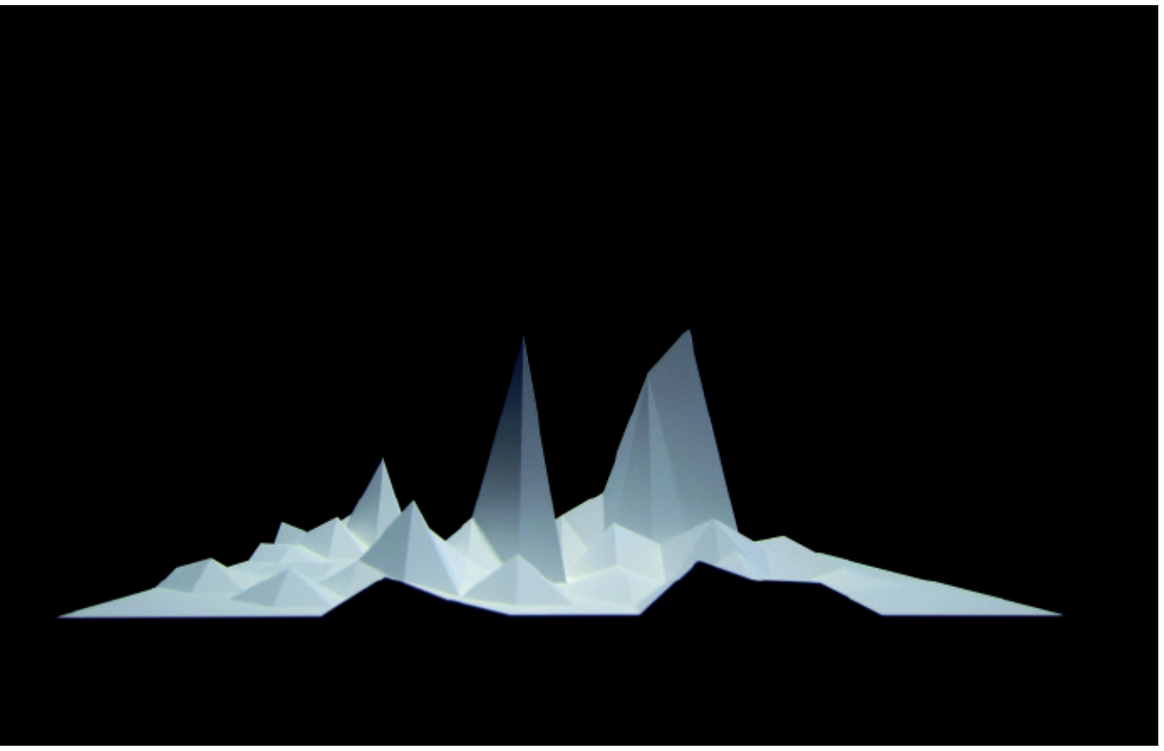
For Sabine Kacunko, the presentation of bacterial time cultures permitted a holistic world and outlook on life. The focus of *Looping Life* opened up and advanced the discovery of the Hungarian doctor Ignaz Semmelweis (1818–65): Semmelweis was not only responsible for the discovery of bacteria as the cause of disease but also knew how they could be prevented through appropriate hygiene; his discovery has ensured that many lives have been saved up to the present day. *Looping Life* was the continuation of Sabine Kacunko's 'Bacteria Art' over recent years, for which she's developed a specialized presentation method that can also be utilized for diagnostic medicine or biofilm research.

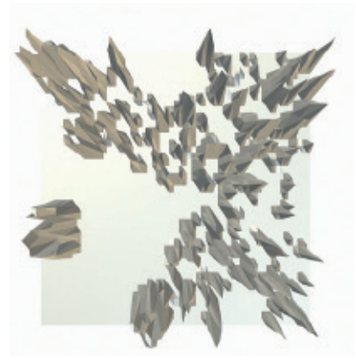
The exhibition was opened with the performance *Hit and Run:* The dance performers Mata Sakka and Joris Camelin delivered imaginative possibilities of an interpretation of the bacterial movements found in the blood and translated them into the physical world.

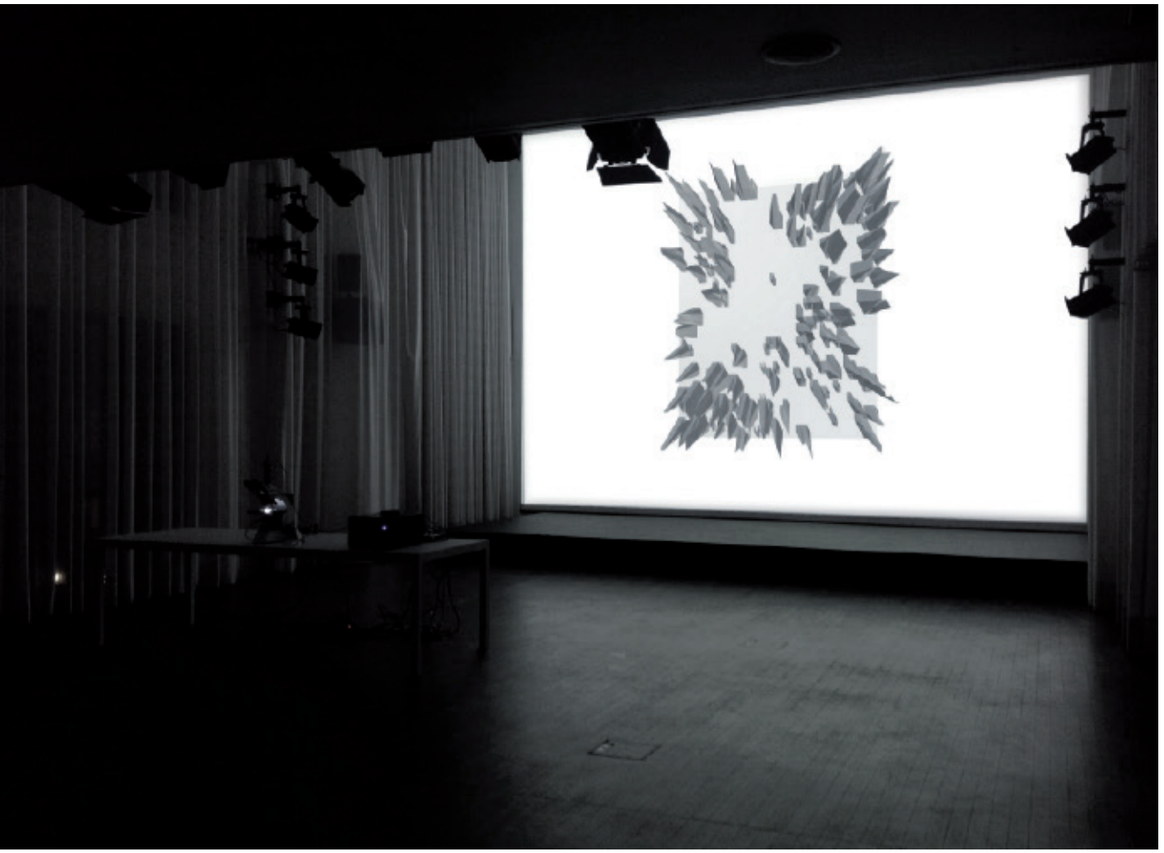
The artist placed a drop of blood taken from her fingertip under a dark field microscope fitted with a video camera and connected to a PC. The microscopic images were enlarged to 1000x their size and made visible to visitors on a monitor and other projection surfaces. During the performance, the artist added various substances to the drop of blood. Reactions in the blood and the movement of the tiniest particles, or "endosymbionts," were analyzed with the help of specially developed software, which translated the transformations both visually and acoustically, live and in real time. In English, the epithet "hit and run" is used to refer to one of the two main mechanisms of the infection process.

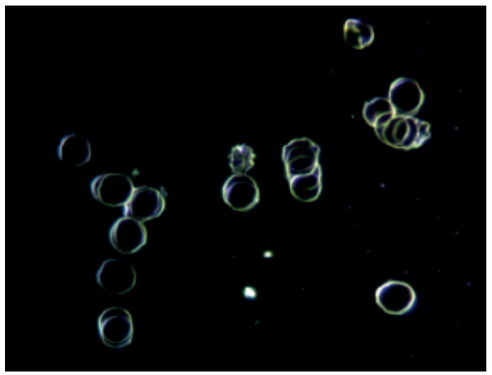

COLLEGIUM HUNGARICUM







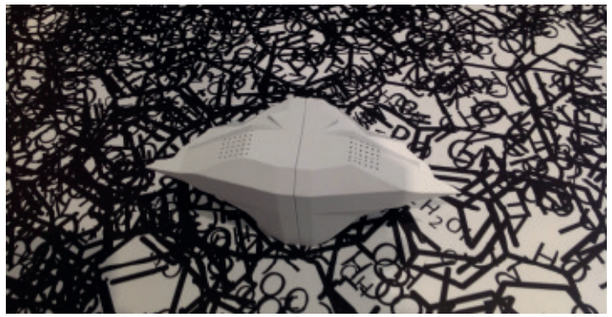




Sabine Kacunko

Looping Life: Corpuscles

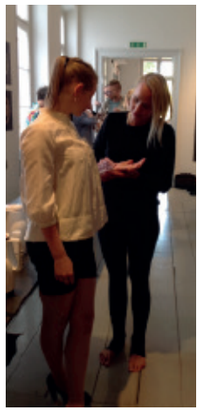
(2015)



An art Performance directed by Sabine Kacunko and executed by Joris Camelin and Eija Ranta. The performance, including two performers and a mobile sound sculpture, is a continuation of the artist's bacteria art in recent years, for which Sabine Kacunko applied different methods of representation also used for medical diagnostics and the study of biofilms.

Blood is the origin of life, a life force. Yet, environmental toxins create pathogens, such as bacteria, that enter the blood and make us sick, endangering human and animal biodiversity. The course of development taken by these microorganisms in the blood depends on its specific milieu, which is determined by its variety and pH values. Substances foreign to the body can be measured in blood levels (blood plasma) and, thus, reflect the exterior milieu. The performance *Looping Life: Corpuscles* makes this process visually, audibly and kinaesthetically perceptible. *Looping Life: Corpuscles* opens up another field of interdisciplinary research to the artist's investigations, focusing on the work of pathbreaking physician Ignaz Semmelweis (1818–1865): Semmelweis not only discovered early on that bacteria were the cause of disease but that their spread could be prevented through simple hygenic measures. His findings saved and continue to save lives to this day. Yet, despite his success, the work of Semmelweis went long unrecognized. His own students had little regard for the necessity of hygiene, and many physicians simply did not want to accept the idea that they themselves were responsible for the infection and spread of diseases they were attempting to heal. Some, like the German physician and obstetrician Gustav Adolf Michaelis (1798–1848), were so troubled by this discovery as to take their own lives. Michaelis was the first to confirm Semmelweis' findings and defended the latter's work against all opposition right up to his suicide. Not until his students submitted a request to the Danish king was Michaelis named director of the birth house and head instructor of the midwife school on 28 August 1841. He was not, however, afforded the title and remuneration of a professorship.

Sabine Kacunko used the sounds generated by the particle movements in her blood, as seen in *Looping Life / Hit and Run* (2013) as the basis for the performance piece *Looping Life: Corpuscles*, to take place at the conference organized by Medical Museion Copenhagen. Audio data, generated in collaboration with Dr. Paul Modler (Karlsruhe) served (as already in Paris in 2011) as the basis for the current performance piece (a corpuscle is a tiny, free floating biological cell, especially a blood cell). The piece might best be defined as a mobile sound scultpure: a 3D model of the artist's *haemogram*, or blood test, fitted with a speaker and a thermometer, emits atmospheric sound elements. The audio data was generated with the help of specially developed software that transforms into sound the reactions of "endosymbionts" (cf. *Hit and Run*, 2013) to elements introduced to the cell environment by the artist. Dancers tossed the "particle" to one another and members of the audience, or move the object through bodily contact with (volunteer) participants.



BIG BACTERIA Series. A Selection of Bacteria Images

195 Sabine Kacunko, *Fern* (2012/14). Microscopic image of bacteria genus Paenibacillus (cultured by Eshel Ben-Jacob). With kindly thanks to Eshel Ben-Jacob.

197 Sabine Kacunko, *Vanitas* (2009). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

198/199 Sabine Kacunko, *First View* (2015). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from Colosseum.

200/201 Sabine Kacunko, *Untitled* (2009). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

202/203 Sabine Kacunko, Untitled (2012). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a wild boar skull.

204/205 Sabine Kacunko, *Untitled* (2009). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a fish.

206/207 Sabine Kacunko, *Melancholy* (2009–13). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

208/209 Sabine Kacunko, *Traces I* (2009). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a chicken foot.

210/211 Sabine Kacunko, *Untitled* (2009–13). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

212/213 Sabine Kacunko, *Bubbles* (2015). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from artist´s saliva.

214/215 Sabine Kacunko, *Traces II* (2009–15). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

216/217 Sabine Kacunko, *Untitled* (2009). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of wale-vertebra.

218/219 Sabine Kacunko, *Untitled* (2009–15). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a fish.

220/221 Sabine Kacunko, *Bud* (2009–15). Microscopic composite image (stitching method) of fungi, from Prof. A. Gorbushina, Berlin.

222/223 Sabine Kacunko, *Untitled* (2007/12). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a wild boar.

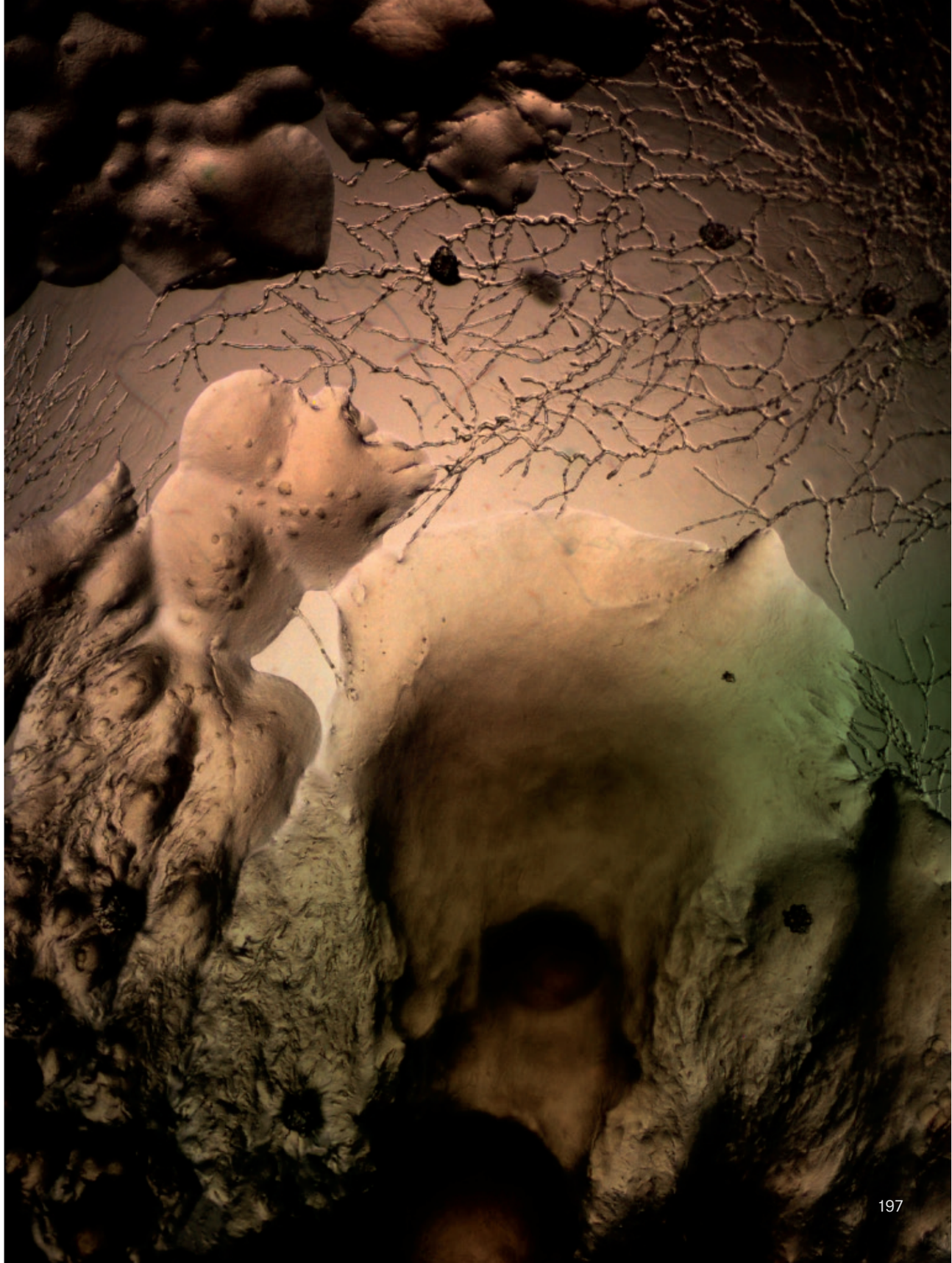
224/225 Sabine Kacunko, *From Dusk till Dust* (2014). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a sun flower.

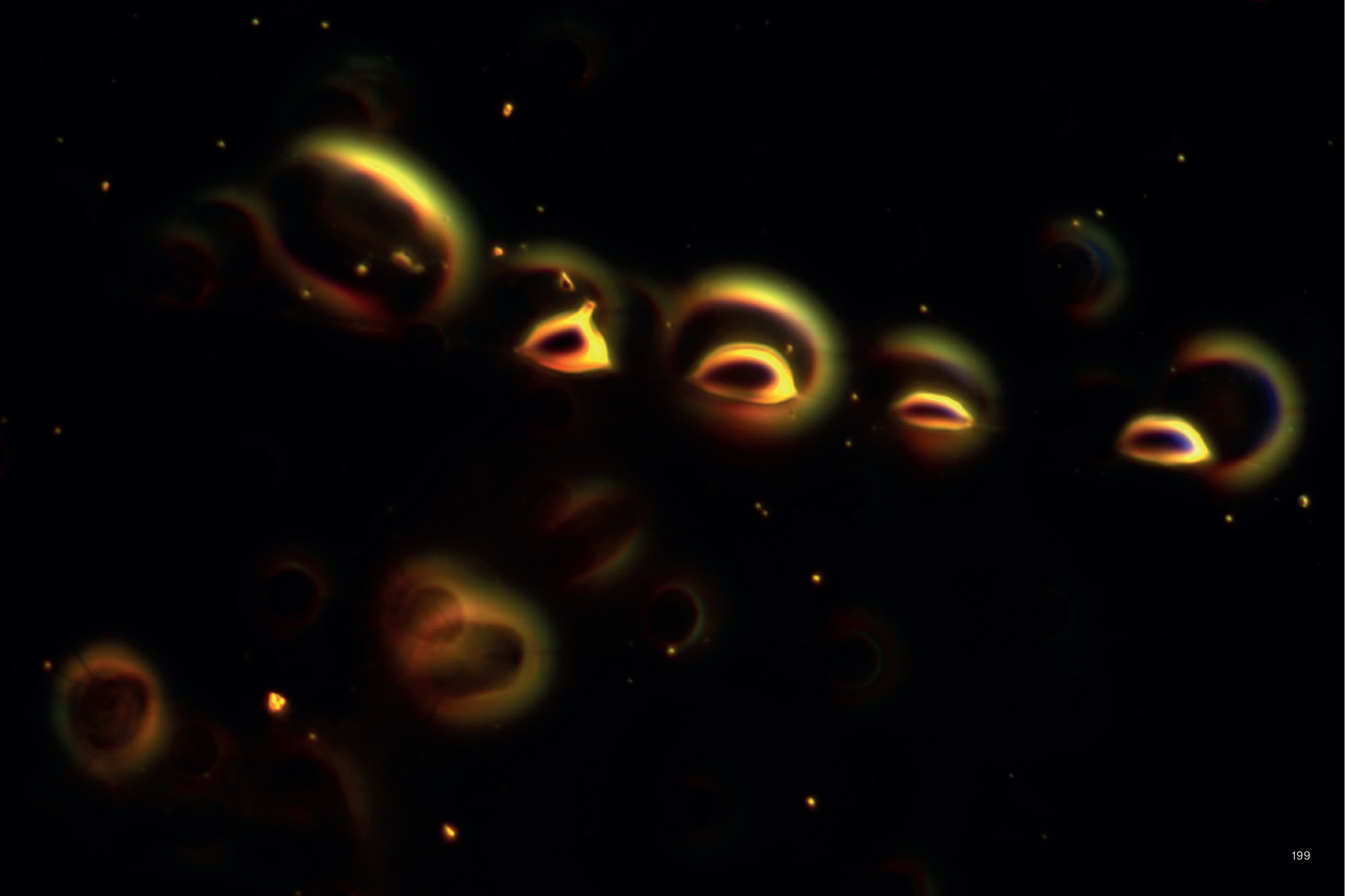
226/227 Sabine Kacunko, *Untitled* (2014). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

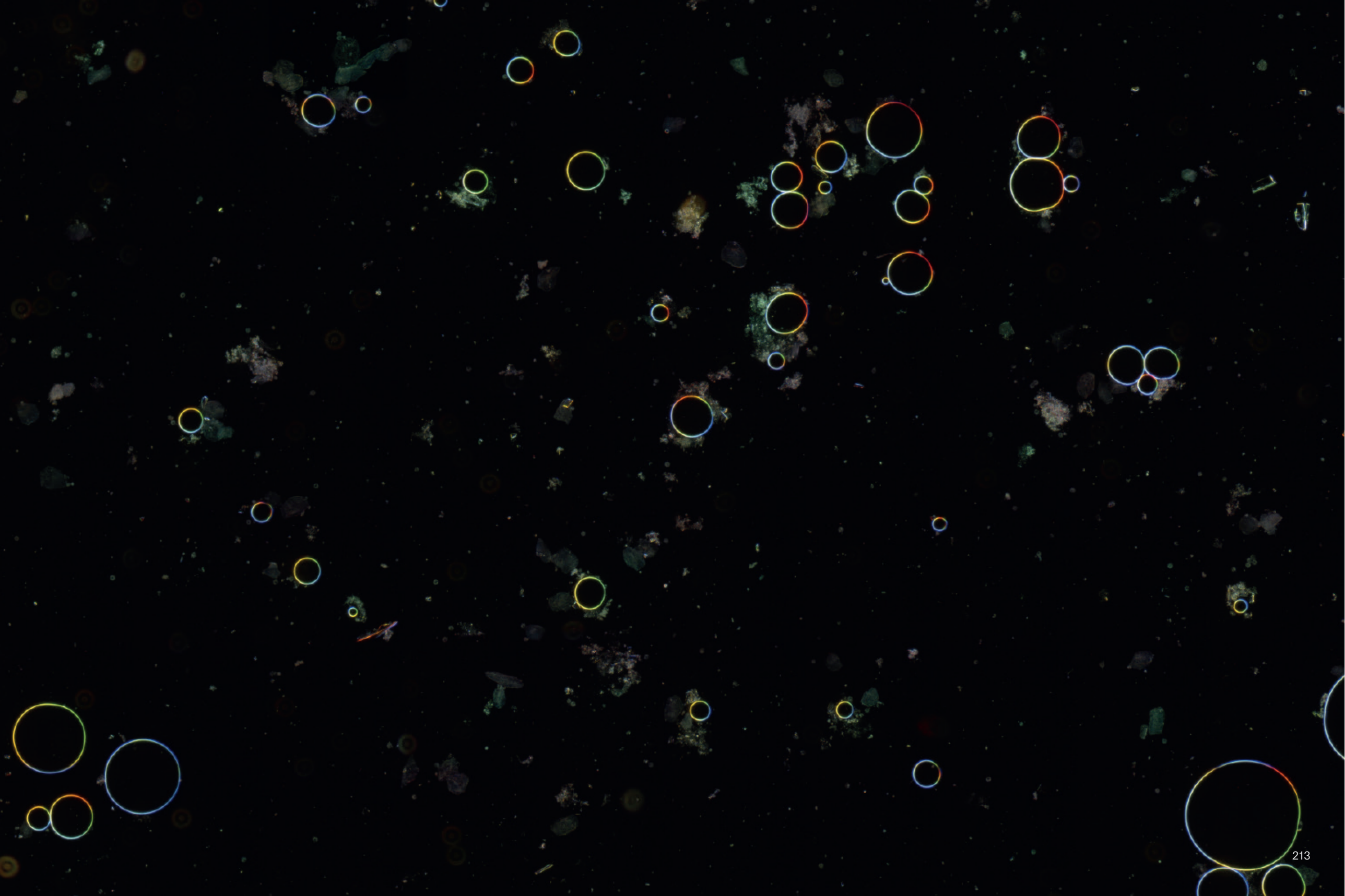
228/229 Sabine Kacunko, *Untitled* (2011). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a sun flower.

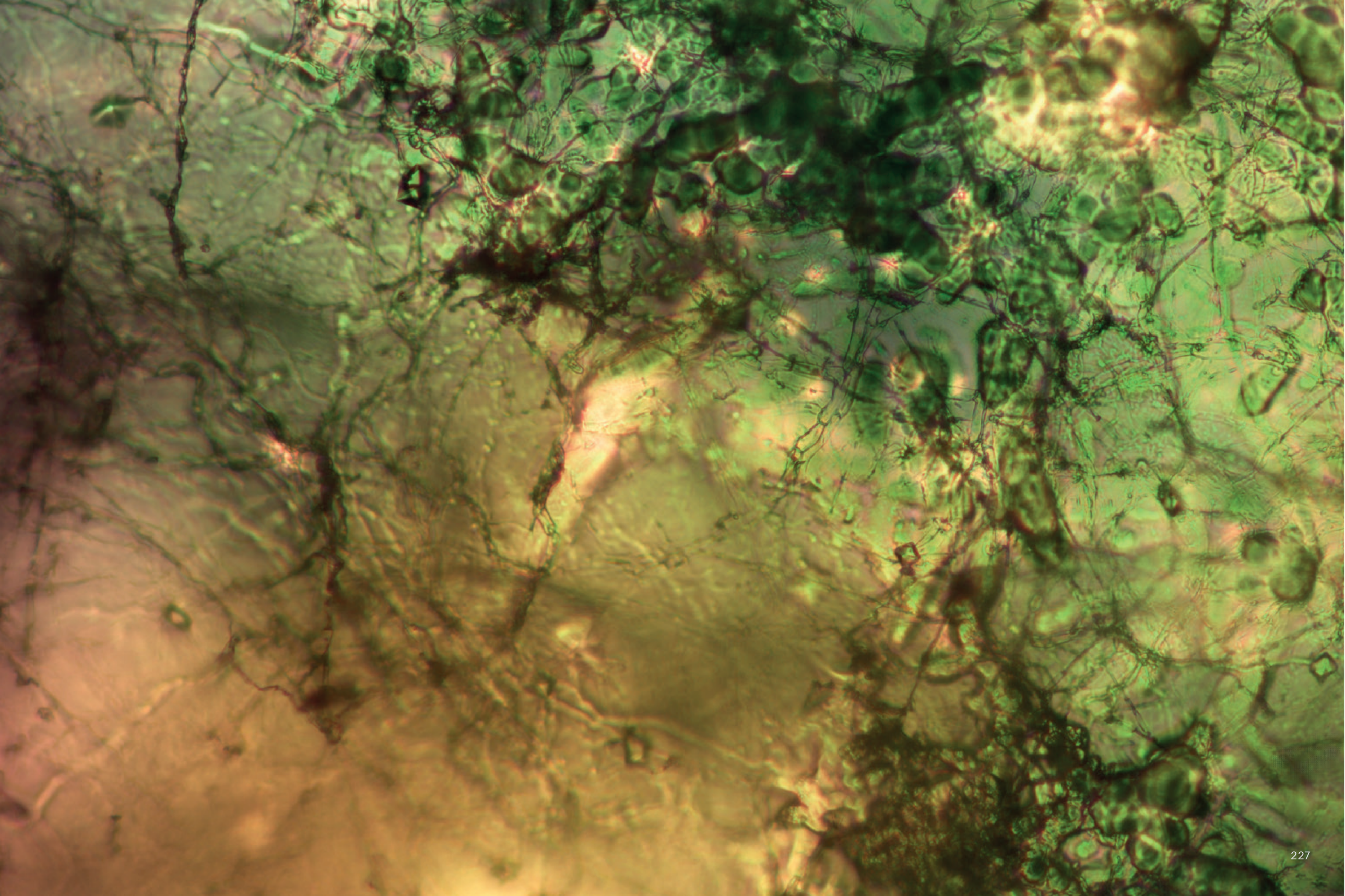
230/231 Sabine Kacunko, *Untitled* (2014). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.

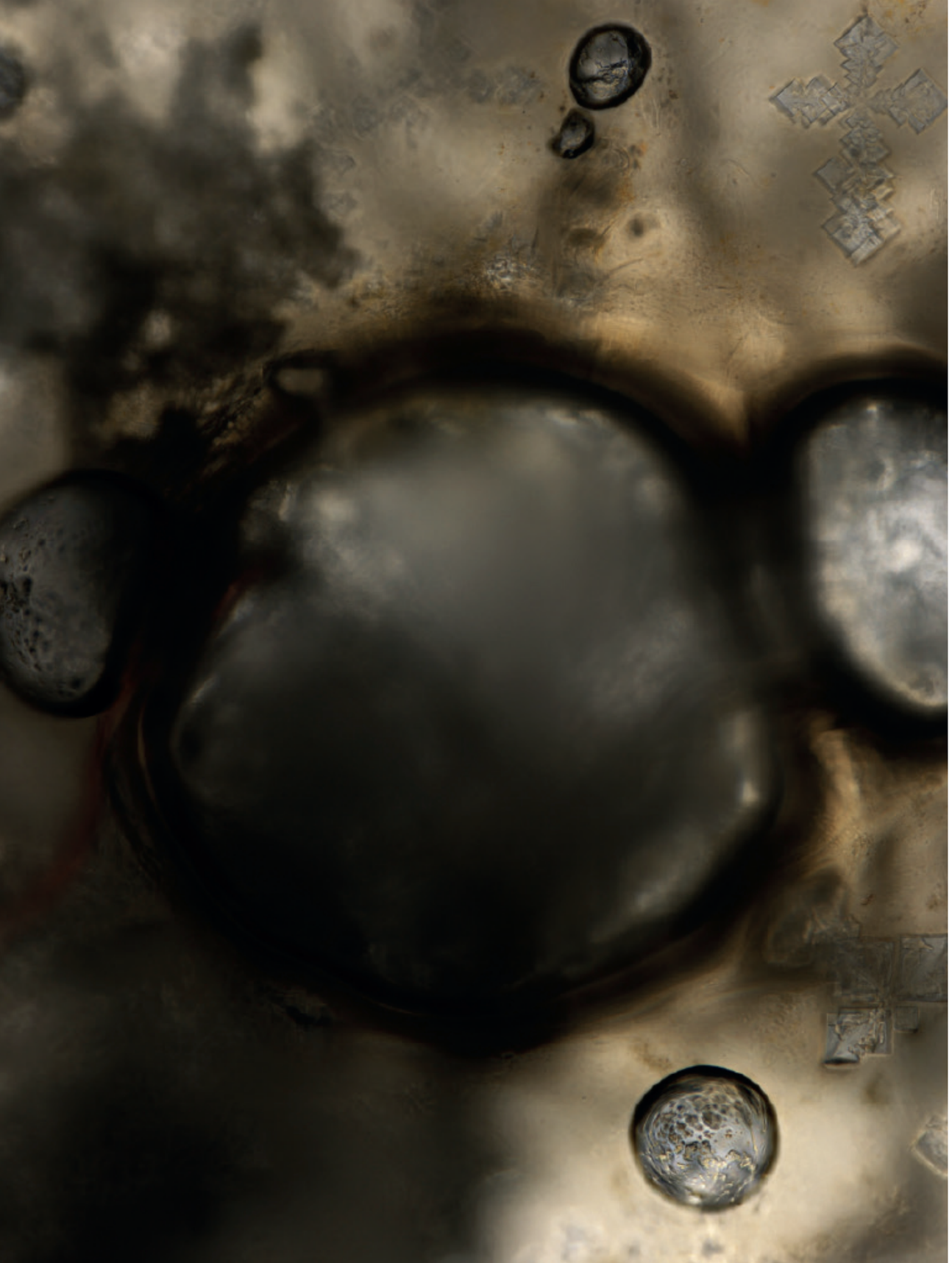
232 Sabine Kacunko, *Cross* (2009–15). Microscopic composite image (stitching method) of different microorganisms (bacteria, fungi, lichens) from a 3 x 4 inch photo negative of a human skull.











Sabine Kacunko

Invincible

Colosseum, Rome (17.–19.09.2015)

Live and recorded media performance under the patronage of UNESCO general director Irina Bokova, the Embassy of the Federal Republic of Germany in Rome and the City of Rome Department of Culture. The piece was untertaken as an interdisciplinary cultural project which included collaborative work and coordination with representatives of the arts, sciences and humanities as well as politics and business. Together with the support of the sponsors through all stages of preparation between 2013 and 2015, they helped this audacious project become reality and a media success.
Invincible was realized with the generous support of the following institutions: UNESCO Paris, the Embassy of the Federal Republic of Germany in Rome, City of Rome Department of Culture, Charité Berlin, University of Copenhagen, Zeiss Jena, Sigma Düsseldorf, Acea Rome, Code Alliance Berlin, Horn Imaging Aalen, Trollfilm Berlin and World Health Summit Berlin.

Invincible wouldn't have been possible in this form without the support of many friends, colleagues and individual helpers, to whom Sabine Kacunko has a special debt: Sara Abou Said, Maria Beatrice Andreucci, Giovanni Antonini, Marco Antonini, Barbara Basile, Cornelia Bauer, Britta Beerwerth, Maria Grazia Bellisario, Thomas Bjarnsholt, Claudio Bocci, Giovanni Bonifacio, Volker Brinkmann, Matthew Burbidge, Dr. Tobias Busch, Joris Camelin, Luigi Carosio, Fabio Cesarini, Genesio Coccia, Cinzia Conti, Daniela Cozzi, Claudio Crescentini, Detlev Ganten, Volker Hassemer, Slavko Kacunko, Andreas Kipar, Luana Carina Knipfer, Michael Larsen, Debora Lepre, Thomas Leya, Paul Modler, Julia Neller, Martina Nibbeling-Wriessnig, Carola Norcia, Paolo Pierf, Oliver Poche, Stefano Porro, Svenja Prigge, Rosella Rea, Dagmar Ringel, Daria Rizzello, Leonardo Ruvolo, Maria Laura Santarelli, Roman Schäfer, Tatjana Schenke-Olivieri, Wilhelm Schmidt, Frank Schneider, Volker Schräger-Enkirch, Serena Spartano, Jens Streckert, Lidia Strube, Gudrun Strümpf, Felix Trolldenier, Antonia Weber, Dr. Michael Worbs, Anne Zdunek.

The project included a side event entitled *Big Bacteria For Micro-Humans? Health & Heritage in Focus of Arts and Sciences* with presentations and a panel discussion at MACRO Museum of Contemporary Art of Rome (15.09.2015, Via Nizza 138), organized by Claudio Crescentini. The panel discussion focused on important aspects of an integrated mode of health and heritage research. With Sabine Kacunko's bacteria art in mind and with reference to the related Big Bacteria research network, the strategies for cooperation between the cultural and natural heritage and health issues were discussed. The panelists were: Arch. Maria Beatrice Andreucci (specialized in Landscape Architecture and Environmental Design, Faculty of Architecture, Sapienza University, Rome), Professor Giovanni Antonini (Molecular Biology at the Department of Sciences, Roma Tre University), Dr Claudio Crescentini (responsible for exhibitions at MACRO), Professor Slavko Kacunko (Art History and Visual Culture at the Department of Arts and Cultural Studies [IKK] at the University of Copenhagen and elected member of Academia Europaea), Dr Massimo Papi (head of the Task Force "Ulcer and vascular dermatology", IDI-Rome), Sabine Kacunko (artist and founder of MICRO HUMAN NPO, Berlin).

In a letter from 27th March of 2015, Irina Bokova, the Director-General of UNESCO (17. March 2015) confirmed "[...] the patronage of UNESCO for the [...] activity entitled "Invincible," which seeks to highlight the key role of light in science and culture through a light installation, and that is scheduled to take place at the Coliseum in Rome [...] As a valuable addition to the year-long celebration of the International Year of Light and Light-Based Technologies (IYL2015), this event that will use innovative technology to reflect the light-conditioned origins and transformations of life at the culturally and historically important Coliseum certainly will contribute to raising awareness on the importance of light and optical technologies in daily lives. It is with pleasure, therefore, that I grant the patronage of UNESCO to this activity [...]."

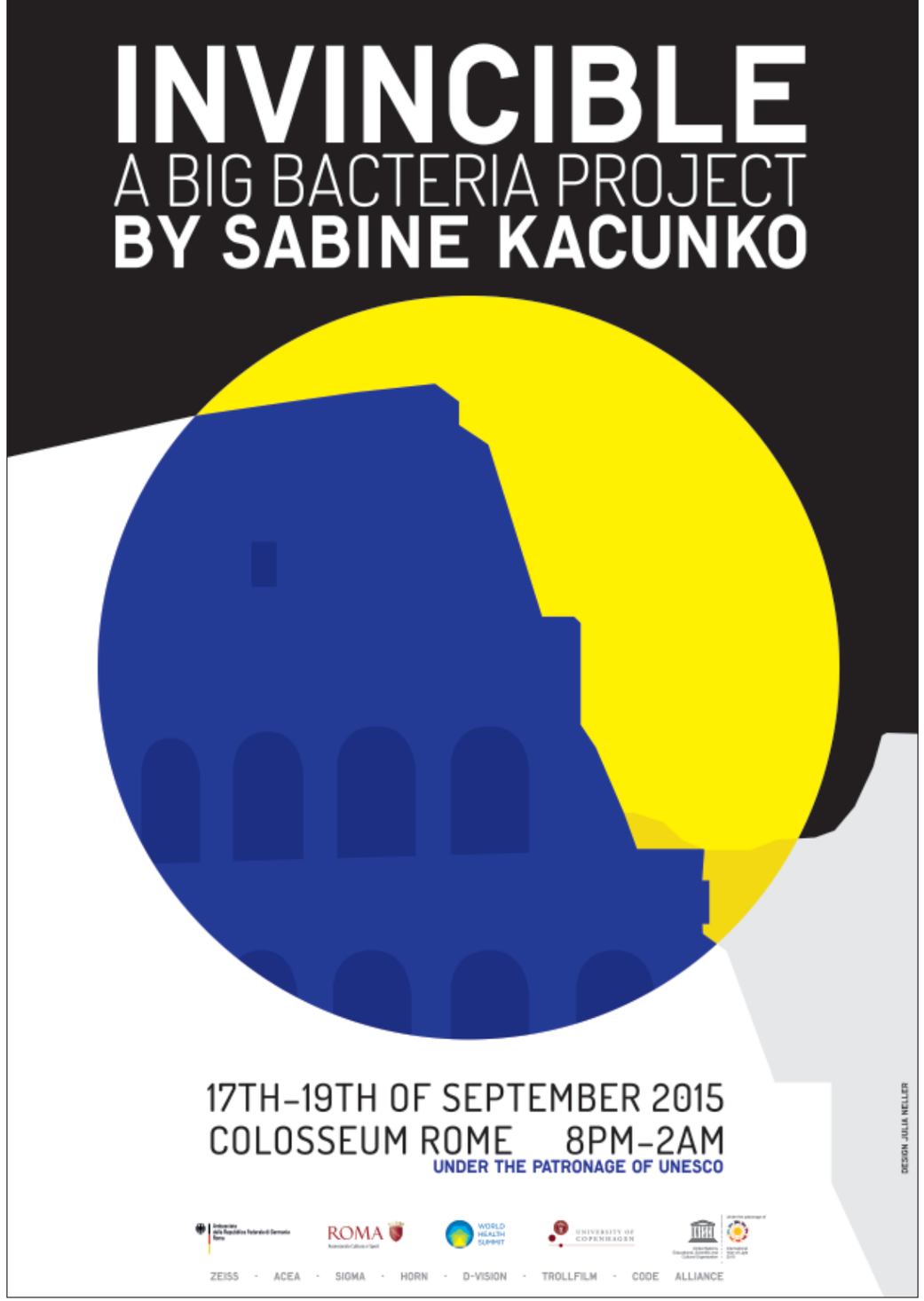
For further details cf. Section 1.

236–241 Sabine Kacunko, *Invincible*, Rome 17-19. September 2015. A selection of the projected images composed of the own made light-microscope recordings with the images taken by Dr. Volker Brinkmann, leader of the Core Facility Microscopy at the Planck Institute for infection Biology in Berlin and images acquired on a FEI Quanta 3D FEG at The Core facility for Integrated Microscopy, Faculty of Health and Medical Sciences, University of Copenhagen. The latter images were captured by Michael Larsen and sample preparation was supervised by Klaus Qvortrup and Thomas Bjarnsholt. They show electron micrographs of a sample including bacteria and other microorganisms, collected from the travertine wall of the Colosseum, Rome. The images are evidence of immense bioactivity that ranges from remnants of long-dead bacteria to what appears to be very vigorous biofilms and living fungi. Samples were further processed in collaboration with the Department of Immunology and Microbiology, the Faculty of Health and Medical Sciences, University of Copenhagen.

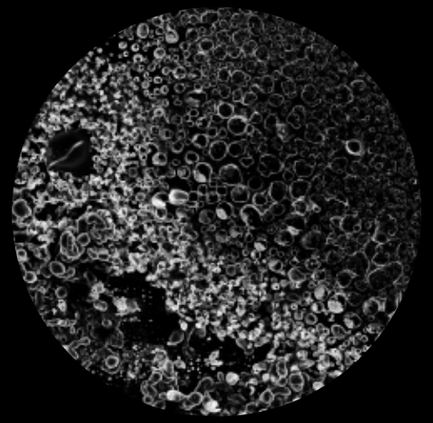
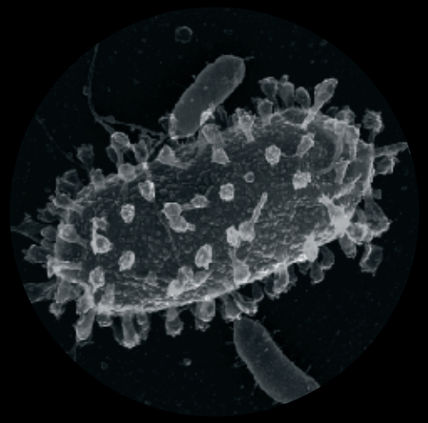
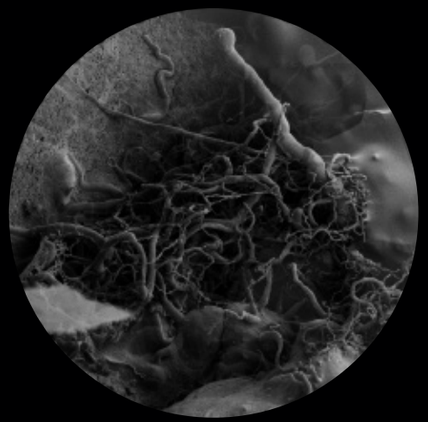
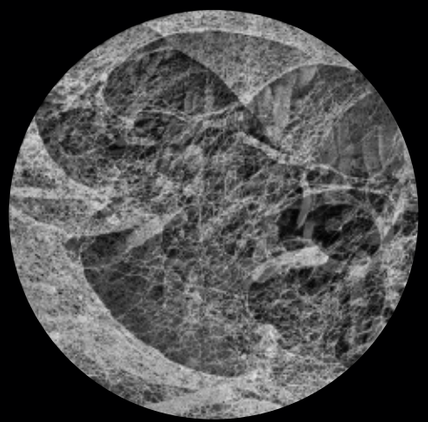
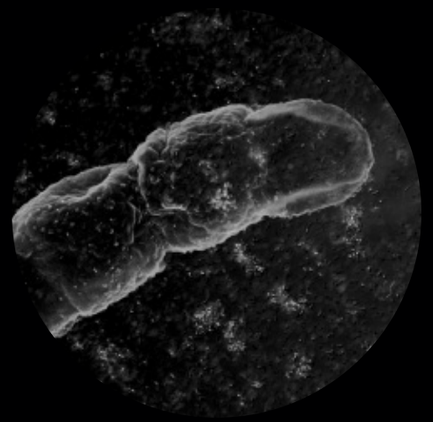
242–262 Sabine Kacunko, *Invincible*, Rome 17-19. September 2015. Impressions from the Colosseum site.

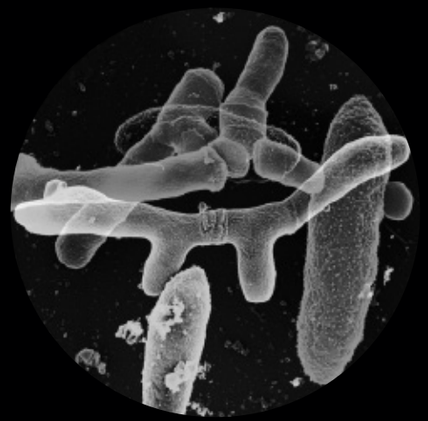
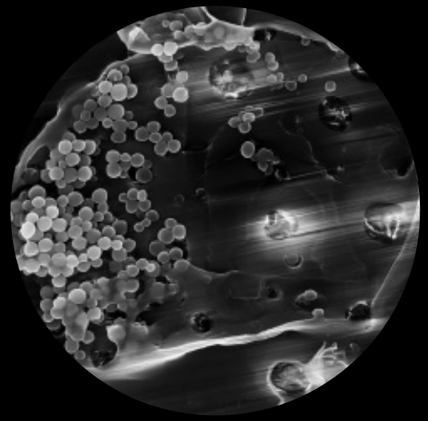
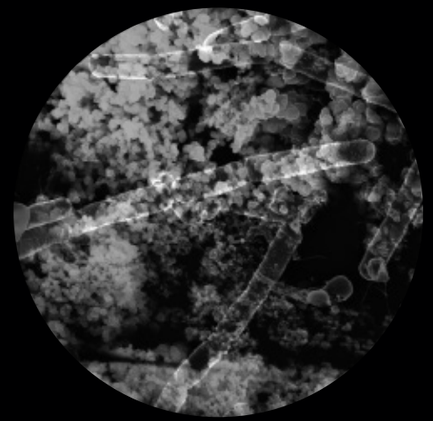
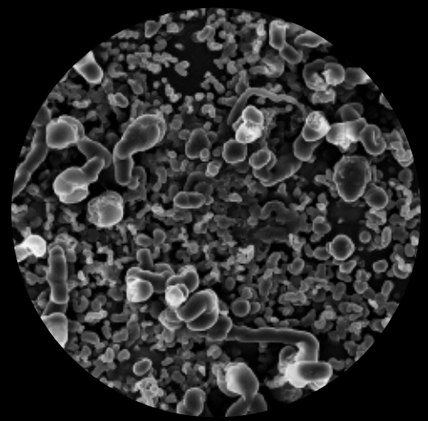
263–267 Sabine Kacunko, *Invincible*, Rome 17-19. September 2015. The crew and the technique.

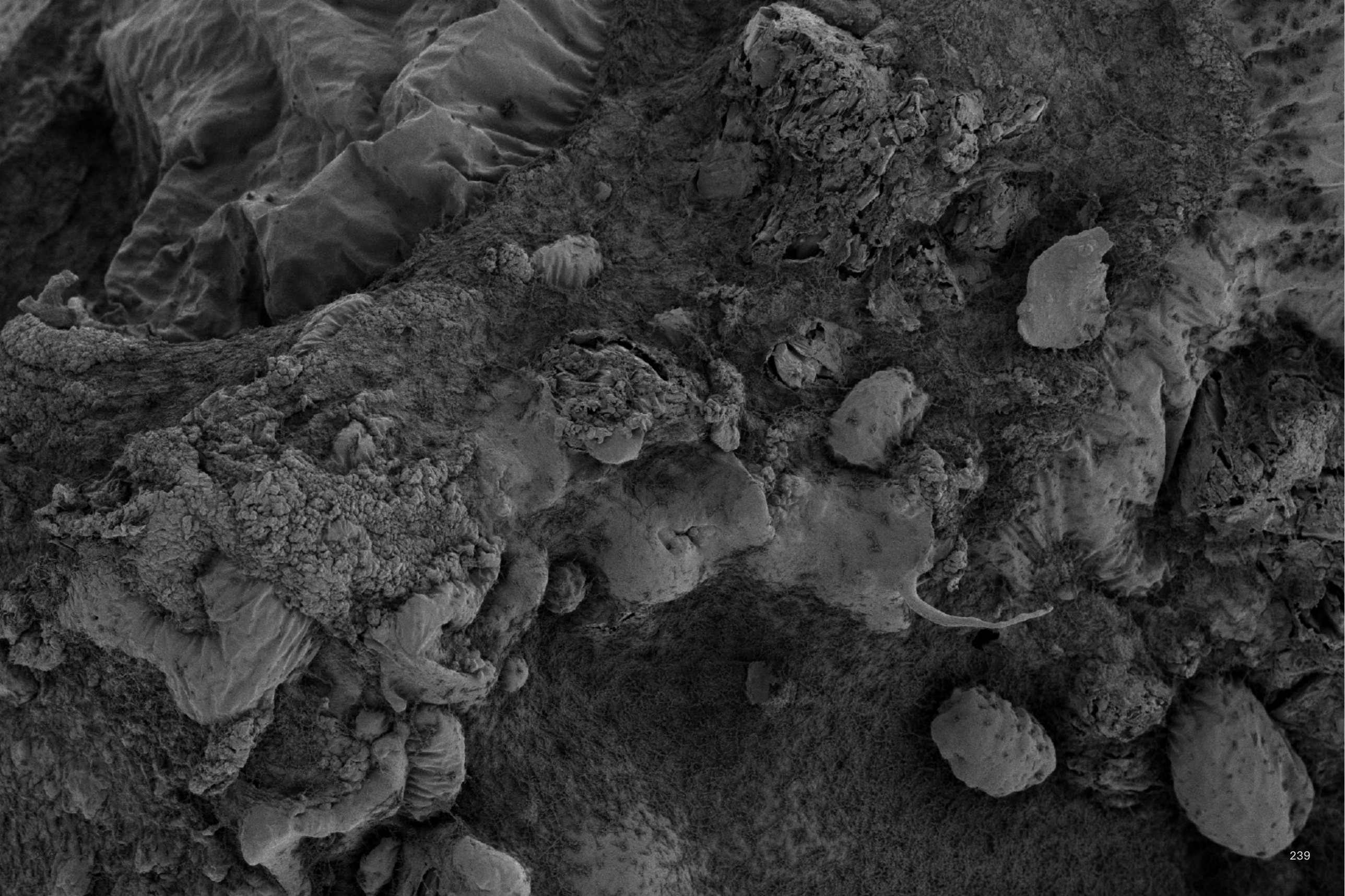
266–269 Sabine Kacunko, *Invincible*, Rome 17-19. September 2015. Impressions from the opening-reception on 17th at the terrace of Monumento theNazionale a Vittorio Emanuele II.



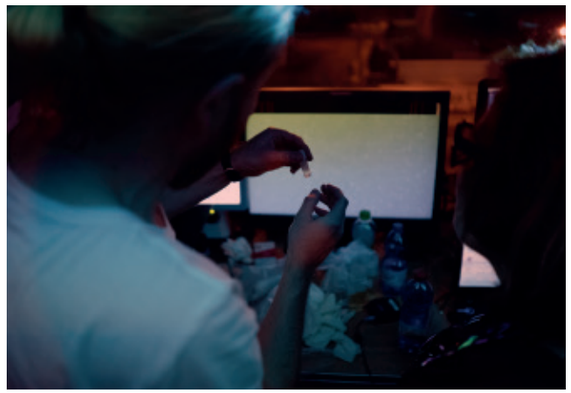


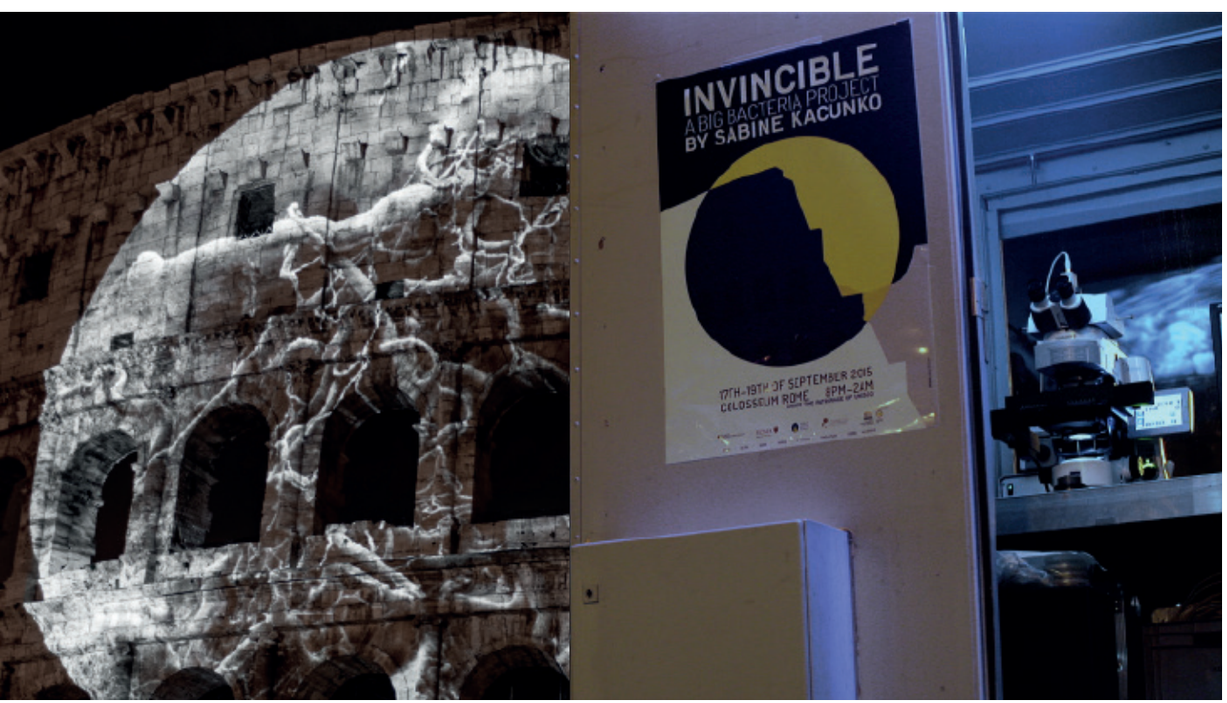








CREW AND HELPERS




INVINCIBLE
A BIG BACTERIA PROJECT
BY SABINE KACUNKO
17TH-19TH OF SEPTEMBER 2015
COLOSSEUM ROME
8PM-2AM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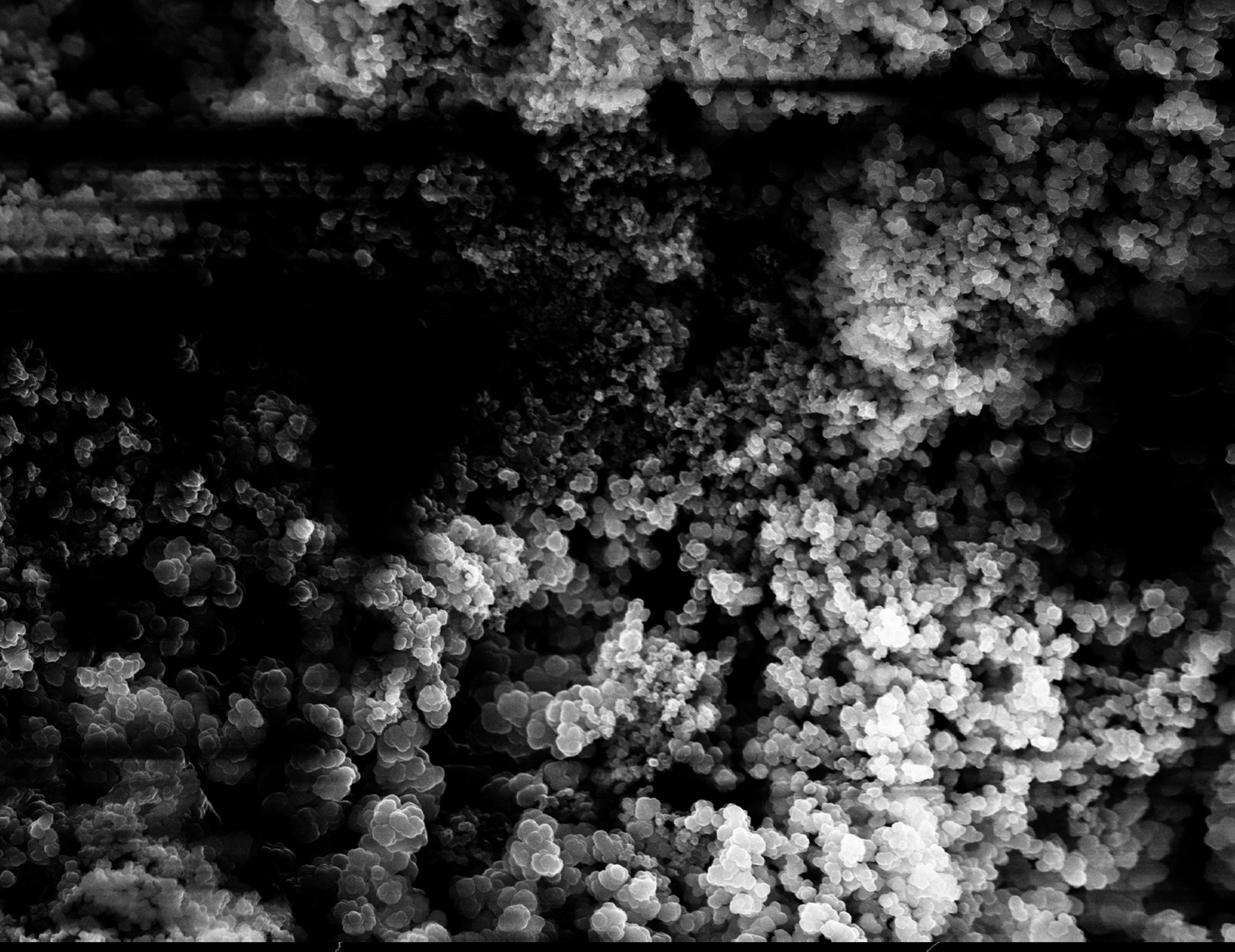

INVINCIBLE

This book follows the major tracks of Sabine Kacunko's artistic development which commenced with analogue b/w photography, slide photography and photographic installations and led to interactive light and closed circuit video installations, media performances and permanent installations. The range of the presented works also covers audio and networked sculpture and choreography as well as performances and projections in public spaces, conceived for and accomplished in collaboration with major cultural heritage sites and scientific institutions, media partners and diplomatic offices.

The volume appears on the occasion of the project INVINCIBLE – a Big Bacteria project for Colosseum, Rome (17.–19.09.2015), which is being granted UNESCO-patronage in the context of the International Year of Light and Light-Based Technologies 2015: A unique icon of cultural and natural heritage was illuminated by the live and recorded images of bacteria taken from Colosseum and projected on its most exposed north-west side. The intention which Sabine Kacunko follows is to direct attention to public sites with particular cultural, political and ecological backgrounds. With Sabine Kacunko's bacteria art in mind, alleged contradictions between the cultural and natural heritage- and health-issues become therewith the focus of attention themselves.

With a comprehensive catalogue of works 1990–2015 including 280 images and an introductory essay by Slavko Kacunko.

VERLAG FÜR MODERNE KUNST