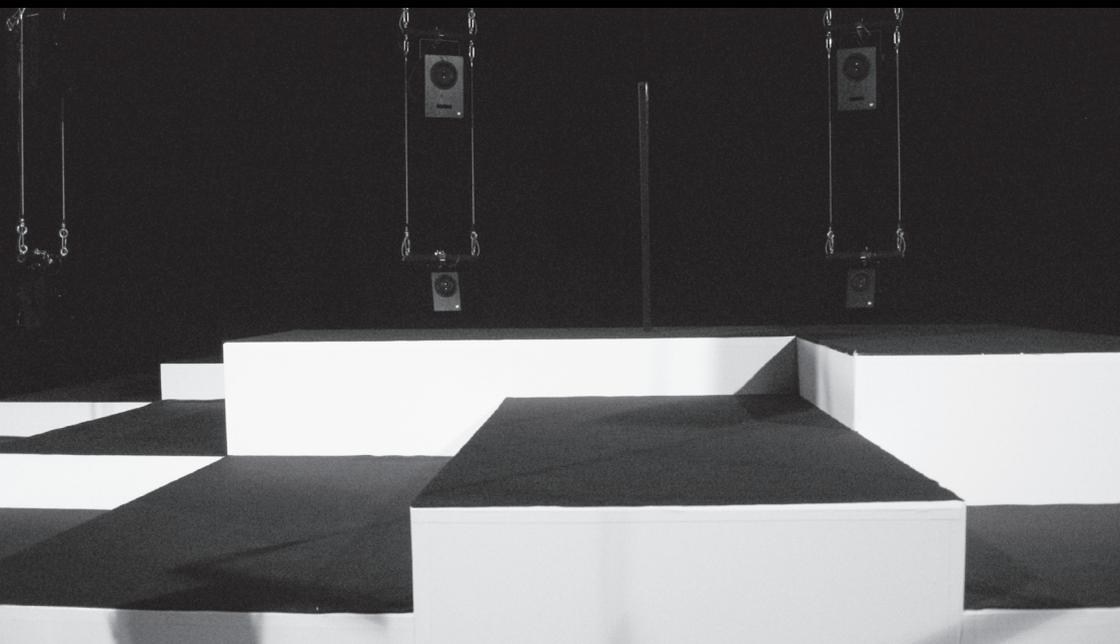


**a very sonic membrane  
filmachine by  
Keiichiro Shibuya and  
Takashi Ikegami  
edited by  
Stefan Riekeles and  
Andreas Broeckmann**

edition jardins des pilotes

diaphanes 





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Edition Jardins des Pilotes

diaphanes, Zürich-Berlin

2008



Dedicated to Maria Shibuya.

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ATAK







## A Very Sonic Membrane – filmachine.

The exhibition of the filmachine installation in Berlin in February 2008 was not only the international premiere of this artwork, which had previously been shown only in Japan, but also the first project of a new association, Les Jardins des Pilotes. This association is dedicated to the presentation and production of outstanding pieces of art, whether as installations, performances, solo and group exhibitions, or publications such as this one.

The gardens we have in mind are delimited spaces which visitors can enter in order to have, and share, a particular experience. These can be physical spaces, indoor or outdoor, but they can also be events in time, porous areas which have in common a certain experiential consistency and intensity.

We conceive of both the visitors and the artists as 'pilots' who pass through these spaces – mobile subjects, frequently dependent on technologies of transportation and of mediation. The best image that we have so far found for our undertaking is that of a flying carpet – the Persian carpet being an old symbol for the Garden of Eden and representing an oasis, an island upon which to rest, a mobile site of contemplation. The flying carpet is a dream, conjured up by nomads who longed to travel fast and safe, and rest at the same time.

filmachine by Keiichiro Shibuya and Takashi Ikegami is an exemplary artwork in this respect. It combines a precise definition of space and time with an expansive, transgressive approach to its own sonic and spatial parameters. The irregular platform construction raises the audience

above the floor level and places each visitor in a distinct position within the spherical sound installation. The artists seek to break with certain conventions of the composition and performance of music, bringing a contemporary aesthetics of sound into a distinctly *artistic* dialogue with recent scientific debates about the theories of chaos and complexity.

filmachine is a machine that generates shapes of sound which the visitor experiences as distinct configurations, objects and movements in space. Shibuya thinks of sound as an object and is interested in its physicality. That is the common base between him and Ikegami, who created the original sound sources from mathematical models, generating unique sonic textures. The resulting work is a sculpture in time whose material is sound and that addresses our perception in multisensory ways. The sound is sometimes perceived as solid, while at other times it appears suspended in ephemerality.

It is a delicate, harsh, and precise noise with a great variety of tonalities that evoke different associations. Some listeners may be reminded of whales, or the jungle, or the sea, while others will hear engines, missiles, jet-planes, and the sounds of war and destruction. Although the possibility of such associations looms throughout the piece, they are frequently lost in an experience of non-mimetic sound. The careful and complex treatment of electronic noise keeps the sound in oscillation between the anticipation of mimetic references, and the transgression into abstraction and radical sonic construction.

The architecture of filmachine – a highly porous sphere of speakers, penetrated from below by the platform, and surrounded by a black

space without apparent borders – is derived from a quality immanent to the sound. The complexity and movement of the noise requires its unhindered expansion into the surrounding space. The experience of perceptual transgression is enhanced by eight long and thin, vertical pylons of LED lights. Their intense and dynamic flicker, which partly responds to the sound, and partly performs independently, widens and, when switched off, collapses the perimeter of the physical space into a black void. The LED columns offer the illusion of a pixel-wide abstract film whose white flashes of light appear split up into the colour components of the electronic images: red, green and blue, when the eye pans past them in a horizontal movement.

While the installation creates complex foldings, and the continuous dissolution and reconstitution of sonic objects and sonic membranes, the spatial and temporal coordinates of its experience are strictly limited. The spatio-temporal arrangement of the musical composition is fixed, finely crafted by relying on evala's programming skills, and demands the visitor's full attention. The duration of the experience is framed by a definite beginning and a definite end. It is a composition that arrests the visitor and that defies idle wanderings, or detached passing through the room. The installation is built towards an aural focus, and it is in fact focalizing the listener on one point, or a small area around the middle of the platform during the time spent listening. This immobilization of the visitor is the condition for the perceptual excursion into an aural, imaginary expanse. The ears of the listener are hooked onto ever changing, ever moving sounds while her or his feet are locked.

The physical space, the container of filmachine, disappears acoustically by absorption, and optically by darkness. The flashing lights are reduced to thin lines that do not offer a visual orientation; in fact they rather disorient the viewer. The space of filmachine is an aural, imaginary space in which sound objects are moving between scales of intimate proximity and extreme distance. Set on hold in a mode of compression and expansion, the visitor becomes the true center of the piece. Standing or sitting on literally shaky ground, one is asked to surrender to a machinic play of sonic figuration and abstraction, of spatial and temporal neutralization in which the space of the listening subject is both congruous, and yet totally different from the virtual sonic event space. It is an experience that, in religious terms, we would have to describe as a form of mystical immanence. It facilitates the encounter with an otherness that is virtual and strange, yet also distinctly non-transcendental in the sense that it does not refer to an entity or form of existence outside of the visitor's physical reality. Rather, it places her or him into a sonic folding of the Here and Now. An experience that is reportedly addictive.

No sense of being forlorn arises in this neutralized space, due to a delicate balance of fragmentation and composition. At all times, we can feel the composer's wish to find form and proportion in the complexity of the sound. Mediated through a complex technical system, the artists are present throughout the experience.

The construction of filmachine as an installation for multiple visitors facilitates a reception that is both collective and simultaneous. The stage around which the audio-luminous event is taking place, is the platform itself, where the visitors become actors for each other.

In filmachine, time is experienced as perpetual nowness, *aufgehoben* in space. As sound art pioneer Max Neuhaus put it, "My 'Place' works share the fundamental idea of removing sound from time and setting it, instead, in place." There is not just one time in the composition. Rather, it is a multi-layered composition with a differentiated structure of time.

Accordingly, the experience of spatialisation is of particular interest. Sound can provide radically fragmented, fractured, chaotic topologies. The eye is bound to a direction; it is always oriented towards the visual object or event, thus orienting the viewer. The ear is never blind, it is always ready to hear, and not oriented towards a focal point. It is therefore much more open to all kinds of re-orientations and dis-orientations. This potential openness of the ear, combined with an apparatus which can facilitate a virtually free mapping of sound events in space, is an aesthetically powerful combination.

Music, as a purely time-based art form, exemplifies the experience of a digital aesthetics. While software is tied to the frequency of hardware, and visual arts are more closely tied to the acquired notions of natural speed determined by the human body, sound art and music can shift time and force their own meter and rhythm onto our perception. This is also why music evades the regimes of mimesis much more effectively than images that always and immediately give it away when they run too fast.

Thus, the carefully crafted and mathematically constructed sounds in filmachine purposefully expand the experience of time and space in the installation.

We would like to thank the artists and their team for an inspiring and highly gratifying collaboration. The Yamaguchi Center for Arts and Media (YCAM), Japan has facilitated the original production of the work and has also, through the support provided by the Agency for Cultural Affairs Japan, made this publication possible. We are also grateful to Musikelectronic Geithain for providing the impressive sound system. Finally, we would like to acknowledge the generosity of the authors who have contributed to this book, and of our publishers at diaphanes Zürich-Berlin who are venturing with us into this new partnership.

Andreas Broeckmann and Stefan Riekeles

Les Jardins des Pilotes e.V.

Berlin, 30 June 2008









# Composing filmachine and filmachine phonics.

By Keiichiro Shibuya

In filmachine and filmachine phonics, all sound movements, their orbits and speeds, are precisely programmed in seconds-per-millimeter. In this composition, vertical sound movements are very important. The only effect of sound movement on a horizontal plane, such as in a 5.1 channel surround system, is panning. Cyclical repetition works effectively in such systems. It became apparent in the process of making this work, that a complex rhythm with dense irregularities works better than a cyclical pulse in three-dimensional sound perception, including vertical and oblique ups and downs. Therefore we are dealing with hybrid, complex and dense sounds and rhythms, with disparities as well as non-periodical movements and attractors.

With this combination of sound qualities and their movements, it is possible to generate previously unknown perceptions, such as “a sound passing through you”, or “a sound which goes down irregularly, like water dropping from a glass, is rising and falling” – , events that cannot be experienced in nature. Obviously th method is not one of “being close to and taking in the complexity of nature by cutting up nature” as is represented by field recordings. Perceptually and structurally, we aim at the creation of a super-complexity, which goes beyond nature by means of perfectly artificial processes. Our motivation is to create nature through sounds generated inside the computer, through the amalgamation of nonlinear science, spatial acoustics, and applied research on spatial localization mechanisms.

This approach advocates a “maximalism” with dense, three-dimensional sounds and movements, against the existing minimalism of pulse and repetition.

This work offers no easy interaction. The only interface that the audience can access is a long and thin switch at the center of the raised platform. When a visitor pushes it, the composition starts, and until the work is finished the switch cannot be used again.

This is a metaphor for the Second World War; in the work, a logistic map program generates sounds that remind us of jet planes and missiles, making warfare an important thematic motif. These sound layers of ballistic mobility and the approximation of white noise like dust, determine the overall impression. – The “approximation of white noise” means that contrary to actual white noise, in which all frequencies are expressed randomly, creating a flat spectrum, the logistic map program distributes frequencies in certain irregularities. This means that it is possible to generate different types of white noise – to be precise, they are sub-white noises: they combine subtle differences which are lower in frequency than when all the waves are absolutely random.

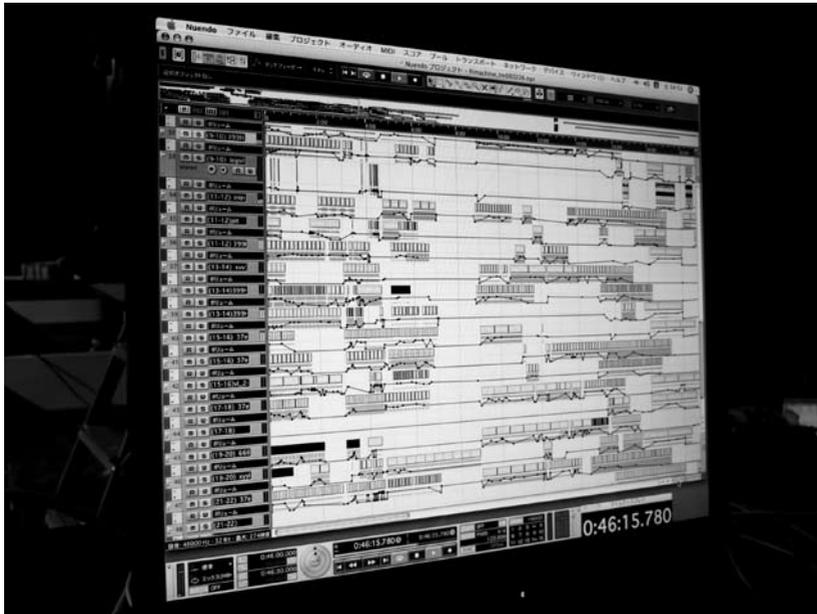
In regular music it is difficult to escape from the structure of keeping the low-pitched sound as a stable base (such as the contrabass in an orchestra or the cyclicism of the kick drum), on top of which there are decorations of high-pitched sounds, i.e. the melody. Orchestral music, club music and most sound installations cannot escape from the format of such a stable, low-pitched sound base, with high-pitched sound decoration based on the two-dimensional frameworks of stereo. In contrast, because of the flexibility achieved by the three-dimensional

sound movements coupled with sound layers, their completely irregular structures and their combination, we intend to obtain a new form of music.

The work *filmachine* lasts twenty minutes, and is configured in five parts. In the latter half, the combination of variant tone systems and movements takes a leading role, whereas in the first half, they are more abstracted to an impalpable level. Let's look at them briefly and sequentially.

"Data logi/ tm\_vertical and diffusion" is dominated by layers of sound clusters generated through a logistic map, and by the continuation of irregular sound movements created by the "Tape & Machine" program. Regarding the sound movements, the first part is dominated by vertical movements, such as sounds which run to minus sixty meters under the ground, and sounds which run up from minus sixty meters to twelve meters above ground. Immediately afterward, from 1'00" to 1'10", the sound falls down to thirty meters underground, followed by a process of converging on the Lanford attractor, in horizontal sound movements between right and left, or back and forth, depending on the listener's position.

In the "jet horizontal/variation of aggression" section, jet plane-like sound clusters expand in literally every direction in patterns of various movements. I intend these to be variations on battle and attack sounds, as well as their mimetic description. From the beginning to the point of 0'18", this section starts with a sound cluster "going through you" from a skewed 45 degrees; you feel it diagonally, from front and behind, sound



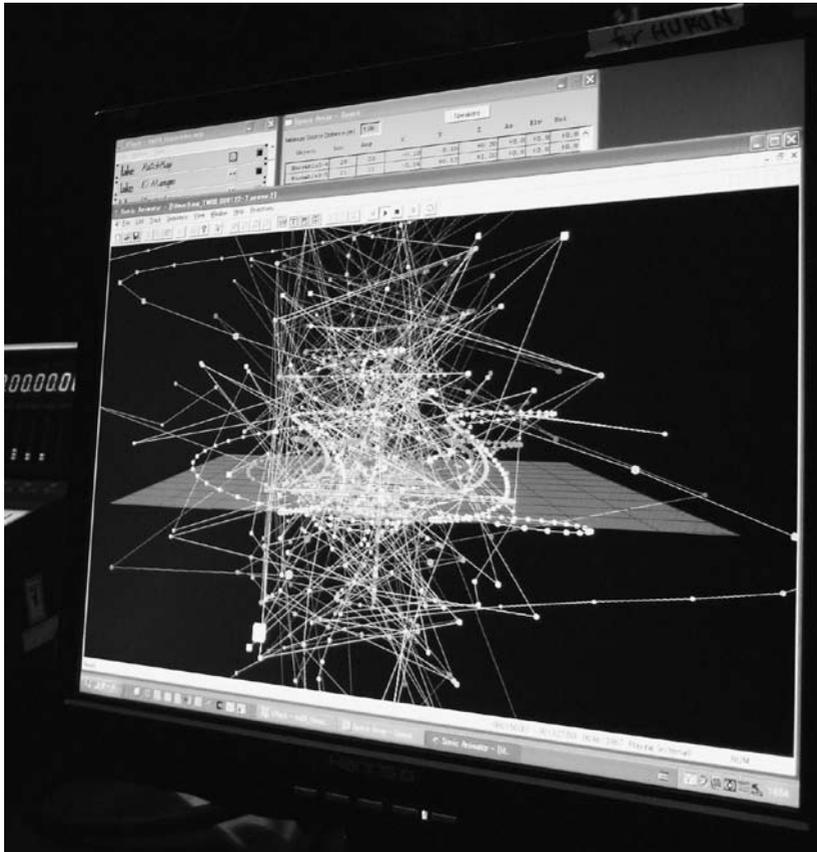
*The graphical user interface of NUENDO with the composition of filmmachine on the timeline.*

movements continue going through you in various vectors and at various distances. The second half is sound gyrating, and a mist of sound soaring and whirling like sprays of sand, generated by the logistic map program.

“CA\_r18” is a section comprehensively focused on sound generation by cellular automata (CA) and vertical sound movements. Following the arrangement of the speakers in their six-meter-wide column, the sounds rise and fall, forming a sound column, or rather, a cylinder. After that, complex orbital movements through various deformations of attractors interlace and develop. In this section, it becomes apparent that the dense sound repetition with extreme disparities generated by CA is highly compatible with longitudinal perception.

“CA\_r110/guernica\_war piece” is an attempt at making music totally different from the past methods of quotation, variation and deformation. The process of structuring white noise by the logistic map is filled with complex orbits and various angular movements. A perceptual composition is developed in which a wall of sound, a film or membrane is falling down, and moving.

In “logistic white haze\_invisible film and machine”, there is an extremely dense accumulation of white noise the sound membrane floating. The number of various materials used so far are delayed more than a hundred times and are voluminously layered, constantly in flux. Fragments of sound generated by programmes like Tapes and Machines, logistic map, and Cellular Automata, which are forms of hidden machines, are mixed at the boundaries between audible and inaudible. Therefore, this is not



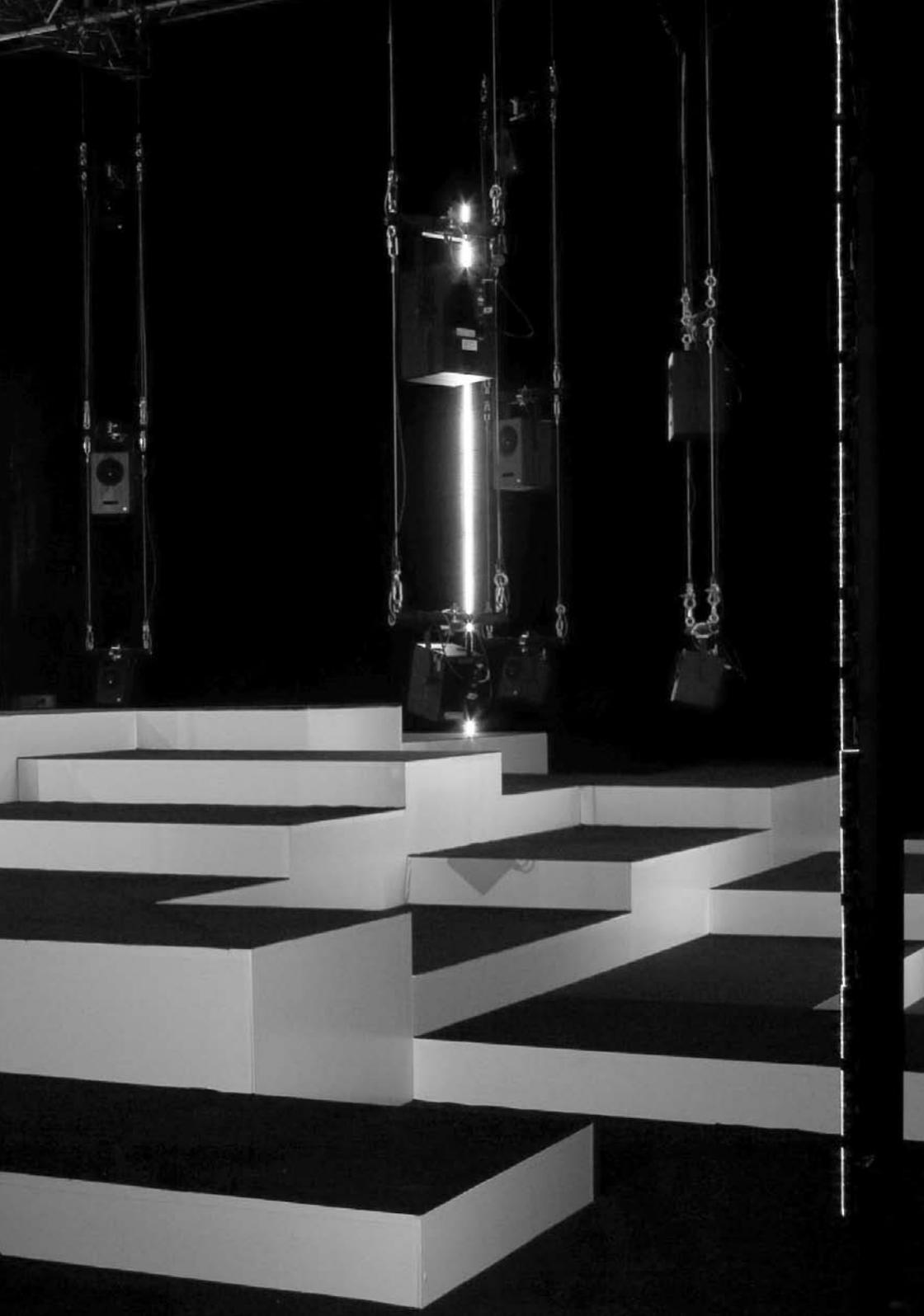
*The software interface to the Huron system. The graphs show the mapping of the sound objects in space. The acoustic space of filmachine extends far beyond the physical space of the installation.*

a static drone. First there are irregularly repeated patterns of movement from the center (listener position) to five meters away. Then, gradually coming closer, are innumerable sounds repeating movements in a chaotic orbit of five centimeters diameter, at a distance of ten centimeters around the listener. The perception of “around you, sounds remain stationary/ they surround you/ they remain congested” is made possible by subtle layer changes, and by innumerable sound sources, which could be said to be 'in perfect opposition'. Moreover, the impression that could be described as a change of volume, is brought about by the transference and disjunction of sounds. Such perceptions can only be generated by an invisible medium-like sound realized in three dimensions. What transmits music and space is tone, color and movement. Perceptual and structural research on super-complexity will be the core of the possibilities for the maximal music mentioned previously. filmachine is the first product of this research.











## Towards a New Form in Music.

### Keiichiro Shibuya and Takashi Ikegami in conversation

The conversation took place on April 17th, 2008 at Tokyo University between Keiichiro Shibuya (KS), Takashi Ikegami (TI) and Stefan Riekeles (SR).

TI: I came to know Keiichiro when I visited Ken Mogi at the Sony Computer Science Laboratories in 2005. I learned that he knew me and that I should have known him because we appeared on the same DVD, a series of interviews about Carsten Nicolai. There are three people from Japan talking about Carsten. That was in 1998 and I didn't have an exact image of Carsten Nicolai's art back then. I only knew him personally. One day he appeared here at my office and told me that my work was very stimulating for his approach to sound art. He had found and bought my book, and when he came to Japan, he visited me.

That is one reason why I came to know this field of sound art. Carsten explained many things to me and first introduced me to Ryoji Ikeda. Carsten showed his "empty garden" at the Watari-Um Museum of Contemporary Art in 1999. Afterwards he did "Autopilot" and we did a joint talk together at the Watari-Um. I put some figures and some text in his Autopilot catalogue. I helped him to project some of the attractors and snow crystals. In Japan, it was Nakaya Ukichiro who, for the first time, made a snow crystal artificially and analysed the shape of snow crystals as a function of temperature and humidity. There is a diagram which is now known as Nakaya-diagram and is famous internationally. I introduced this to Carsten and he created an art piece.

That is how I came to know Carsten and more of the art people around.

SR: Are you working with other artists at the moment?

TI: Not really. I'm only working with Keiichiro now. And a bit with Myong-Hee Lee, the designer who did the interior of the Lotteria burger shops in Tokyo recently. There is a tray paper for which I wrote some lines about chaos, autonomy, life games, synchronization, and cellular automata, which are important elements for complex systems studies.

SR: If a young couple came into the burger shop and asked: "Excuse me, what is Class 4?", what would you tell them?

TI: (lauhgs) I would tell them that Steve Wolfram, when he was a young researcher, defined these classes and thereby initiated the complex systems studies, in some sense. There are 4 classes of spatio temporal patterns in cellular automata. Class 1 is just black and white. Class 2 is very much periodic, regular sine waves. Class 3 is more about chaotic behaviours. Class 4 defines systems that cannot be categorised. The pattern is in between periodic and chaotic. In fact, this classification is very intuitive. There is no mathematical basis for why you can categorise something in one of these four classes. Therefore people argue about it. People were just making new rules and studying new kinds of cellular automata. At the same time there was a bunch of interesting sound activities in art going on.

In this regard 1998 is a special year, a transitional year for me. I started to get interested in cognitive behaviour and went to Paris to work with Luc Steels. There I met Gabriel Orozco and Carsten Höller. Actually, Höller came to my seminars sometimes.

KS: And Marko Peljhan came to Japan to collaborate with Carsten on the “POLAR” installation at the Canon Artlab.

TI: Right. That is why I say 1998 is a critical year for me because in that year I came to know Hans-Ulrich Obrist in Paris and he was very enthusiastic about my work with Luc Steels. Later we had the “Bridge the Gap?” meeting in Kitakyushu in 2001 to discuss the relation between art and science. But to tell you the truth, this conference was pretty confusing. The artists took science in wrong ways and the scientists took art in wrong ways too. (laughs)

One unique experience I had at the conference was when I tried to explain my theory in front of the artists and I realised that they actually don't care about these theories and structures. I was more innocent back then. (laughs) Marina Abramovic stood up, came to me and started sorting my transparencies, putting them together and making some interesting patterns out of them. But it didn't mean anything! It created some beautiful colours and patterns, but you can't read anything into it. And she said: “This is art!”. So this is how we approached each other and I noticed that there is actually a huge gap. (laughs). But of course it was nice to meet all of these interesting people.

People think scientists only care about the content. What is the content of this presentation? But artists care about how to present things. The way

you present something is sometimes more important than the content. But of course both are needed because the way you present gives a very different impression to the people. Take, for example, Otto Rössler. He presents his ideas in a unique way and thus makes a huge difference. The way he presents is so charming and interesting, that is what attracts people. So Rössler is both, art and science.

KS: 1998 is a very important year for me too. Between 1980 and 1990 Personal Computers became available for everybody. Many composers including me were using Apple's Macintosh SE/30 to control synthesisers and samplers. Not to generate sounds though, just to control a MIDI system. But I don't like the MIDI system because it is very similar to a musical score. I wanted to know what the structure of a tone is and I wanted to generate a tone. But in the 80s we couldn't produce new sounds with the computer. However, in 97 that became possible. That was a very big step for me. At the time, I was composing acoustic music with the piano and other instruments. In 98 I stopped this and I changed my style of music. However, for the three following years I couldn't make any music. It was very difficult for me to make music with the computer. I could make interesting and complex music with acoustic instruments and by scoring, but working with the computer is very different. Then, in 2002, I managed to produce music with the computer and I felt that it was getting interesting. That's when I started ATAK.

And I read Takashi's book "Evolutionary Approaches to Complex Systems" which is a very famous book for designers and artists in Japan. A very difficult book. But very famous. And very expensive. 6.000 yen. And no photos! (laughs)

SR: What made you move from acoustic music to the computer?

KS: Acoustic composition involves a very big system. Of course I can write a score, but I need some musicians and a recording studio and a piano. It's always a big project. But when I met Carsten and Marko they had a very small system which was basically just a computer. I was very influenced by this encounter. Another reason is that I can only write the musical structure in a score but I cannot write down the materiality of the tone. The development of the structure of music reached a dead end in the 70s or even the 60s. But the development and research of tone is only enabled with the computer.

When I started composing with the computer in 1998 it was very uninteresting, a bit stupid. I worked every day with only potato chips and water beside the computer. Sometimes I slept but mostly I was working. But it was not interesting. In 2001, I met my wife Maria. She is a person who cannot understand the structure of music, she can only understand the material of sound, saying, "Ah, this is a good tone, this is not a good tone." When I met her I thought that this is a very interesting way of hearing music. And I thought: I am a composer, I am a specialist in hearing the structure of music, but maybe people in fact only feel the tone. So I started to develop tone structures and interesting sounds. Tone is much more important in my music now.

When I met Ikegami-san we had a long and very interesting discussion about art and science and what we think about it. We really had a great time together. We decided to do a new project in June. In December we made the first installation at the ICC - "Description Instability".

TI: It's about the Taylor-Couette-Flow system. We used this fluid dynamic system and tried making noise out of it. We tried to make a new kind of timbre from evolutionary algorithms. But actually I didn't know how to do it. We worked with trial and error. I tried many to make noise out of a computer and then Keiichiro would say that it's interesting or not. It was a very personal interaction, developing the sound piece step by step.

KS: I came here three or four days a week. Then, in December, I did a concert at the ICC which was called "5 new music" for which I collaborated with Takashi. But we still didn't know how to produce new sound material. It was a very difficult process.

TI: After a while we got to know more interesting structures and worked a bit more systematically. And Keiichiro found a system which could create virtual, three-dimensional sounds, called Huron. First I thought that it won't work because there was already a lot of work done with three-dimensional sounds. But he really used it in a new way. I used a logistic map as an elementary generator for the sounds. A logistic map is the simplest mathematical tool to create chaos. But it doesn't generate real white noise, it has a structured spectrum. We tried to amplify these structures. And we changed the parameters and created different kinds of chaos. These differences are easily detectable when you transform it into sound. If you're listening to the sounds created by these two kinds of chaos you can hear the difference. Keiichiro thought that this was an interesting phenomenon.

SR: Is that also interesting for you from a perspective of research?

TI: Well, chaos was something I learned when I was a student. I went to San Diego where Doyne Farmer was teaching. At that time he actually made sounds from chaos. I thought it was interesting, but I didn't know how to do it. Now 15 years later I did it by myself. That is interesting of course.

What I also learned from Keiichiro is that it depends pretty much on the quality of the speakers. Keiichiro introduced me to the interesting details of the precision of loudspeakers. How good speakers produce good sounds might seem trivial, but I didn't know it before. If you are using a very precise speaker like the one from Musikelectronic Geithain, which we used for filmachine, you will get very rigid sound patterns. If you are listening to it with some mediocre speakers, you cannot experience this image. In particular with filmachine, I think it was a new kind of experiment of complex systems.

KS: When I did the concert at the ICC I performed in a radical way. There were many big changes and very high dimensional dynamics. But I felt that these complex sounds I was playing actually needed more dimensions. Our style was too complex for just two speakers. And another interest was to research the sounds in between zero and one, in between sound and silence. This I imagined to be possible with the computer. I talked about this with Takashi. The interesting thing in music is a subtle change. With the computer, I wanted to create a long tone which changes continuously, however slightly. I thought that it would be interesting to develop this sound in conjunction with the Huron system and a bigger speaker system.

SR: Recently, collaborations like yours are getting more attention and are sometimes even encouraged by funding institutions. In your case, you were collaborating to create interesting sound files and then Keiichiro put them together in his composition. However, at the end it all feeds into a music installation which is clearly located in the professional realm of Keiichiro, the composer. Takashi, could you explain a little bit more about where your interest in the arts lies and what you receive in return?

TI: An example: At the “Bridge the Gap?” conference I didn't like the conversations because I didn't know what to talk about with the artists. I didn't know what sort of things artists are interested in. Because without experience in the arts and without really having worked with artists, it is quite difficult to understand the mind set of these creators. Today I think that the intention of making something in the arts and in the sciences can be quite similar.

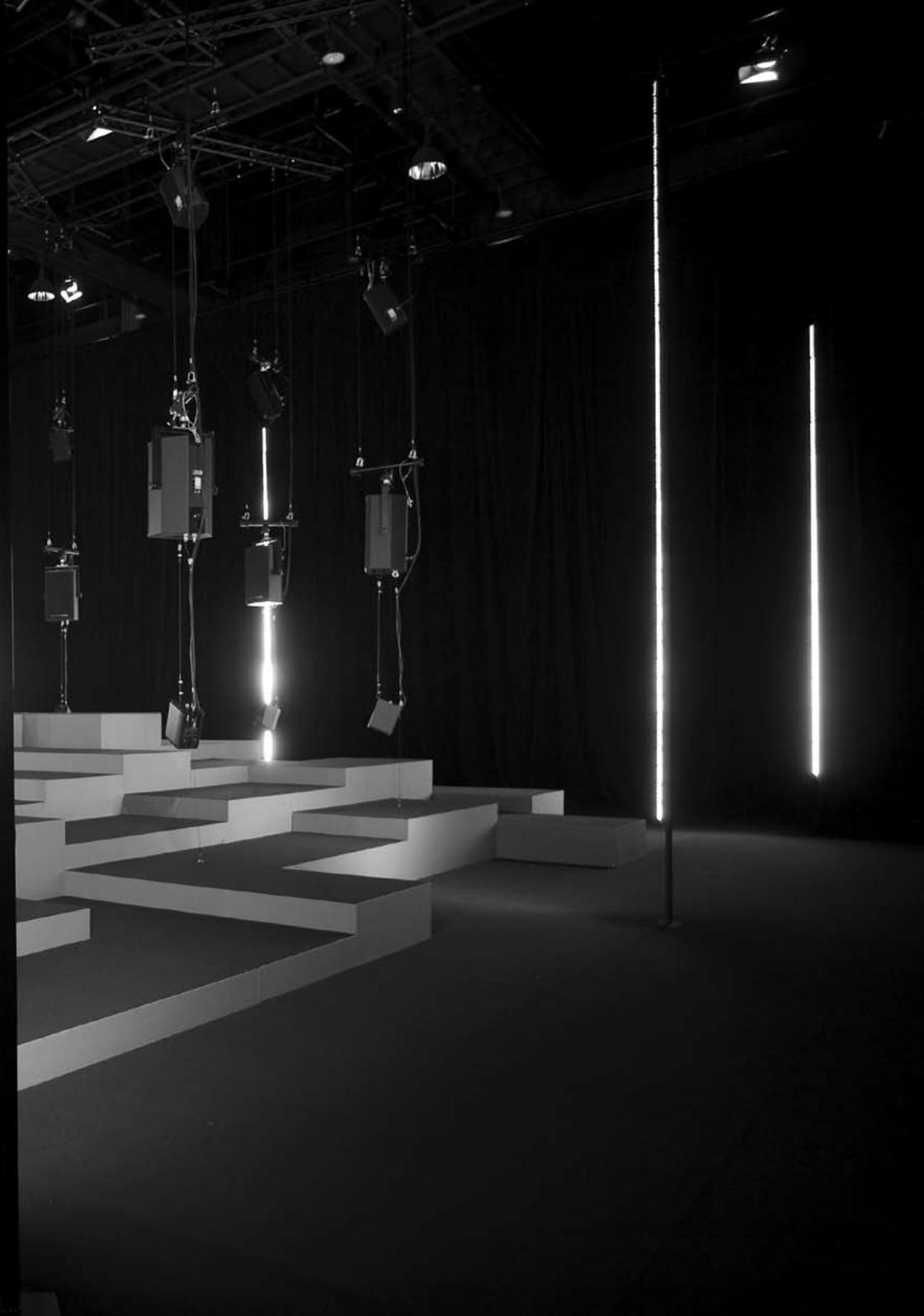
SR: What drives your research then?

TI: It is exactly the same thing as for Keiichiro. I want to make something which nobody has ever seen before. (laughs) Making something new is my strongest motivation. Some people are more interested in explaining, but I just want to create something new. And even if it doesn't explain anything of the world, but if it's interesting, I think it might be even more interesting for me. I think Keiichiro also has this very strong intention of making something which didn't exist before. Creating new kinds of experiences is the purpose of art. Finding new ways of using the brain is what only art can do. That is what Keiichiro is trying to do.

One of the more interesting concepts I could unpack by working with Keiichiro was the concept of time. The way I was using time in physical modelling thus far was very simple and not interesting, it was just a time line. But Keiichiro's idea of time is not just a straight line. Before I met him I couldn't understand how composers can deal with an orchestra having these many tracks in a score. But actually the world functions like an orchestra. There is not only one temporal event going on but many things happening at the same time. There is a layering of many temporal dynamics. Benjamin Libet, one of my favourite neuro scientists, says that there is not only a single time or a single moment of nowness, but that there is a distribution of nowness. Time doesn't always flow into one direction, but is instead coming back and forth and back and forth. What interests me now is how we can we deal with these parallel worlds. Trying to theorise this concept is a very concrete example of what I learned from this work with Keiichiro.

Our collaboration is not just about making art installations. We are working on the Third Term Music as a bigger art and science project. We want to create some kind of philosophy. You may think that philosophies sometimes lead to very concrete technological inventions. But philosophy does not always come first. Sometimes technology comes first. That is my philosophy. So my hope is that this activity will enable a philosophy to emerge from it. For this we need an activity like creating music or art pieces. That's the only way we can achieve a new epistemology or philosophy.









*Previous pages: filmachine at the Studio A of the Yamaguchi Center for Arts and Media (YCAM), Japan.*

An earlier version of the conversation between Kazunao Abe and Keiichiro Shibuya was published in "Arica Culture Art", Issue 4 ([www.arica.jp](http://www.arica.jp)). With thanks to Sayaka Umezawa.

## A New Concept of Sound and Space in Art. Kazunao Abe and Keiichiro Shibuya in conversation

The conversation took place in March 2008 in Tokyo between Kazunao Abe (KA) and Keiichiro Shibuya (KS).

Note: filmachine was produced in a collaboration of the artists and YCAM during a month-long residency in Yamaguchi city, after more than nine months of discussions with chief curator Kazunao Abe. In art, the elements of sound and their spatial expression have a distinct conceptual autonomy from the history of visual art. YCAM supports this kind of sound art through curatorial work and technical assistance.

KS: I feel that the field of sound is at a turning point. We will have to see whether it will be considered as belonging to the field of art or not, and whether the art world can accept the unique quality of concepts based on sound. If sound works were categorised as art or as a form of conceptual art, this would just be a repetition of the past. I'm convinced that, one way or the other, the reception and recognition of sound in art will change significantly in the next few years.

KA: Around the time when filmachine was presented in Berlin, I saw an exhibition of a remake of a sound installation by Bernhard Leitner from the 1970's at the Hamburger Bahnhof museum. In this installation, 72 speakers are suspended in the shape of a horizontal cylinder, in which the sounds are moved around. In this case, Leitner is a conceptualist, and his concept is not based on the compositions and possibilities of

sounds themselves, but on an architectural design that combines a spatial structure with an understanding of the human body, influenced by Oskar Schlemmer of the Bauhaus, and phenomenal sounds that are applied to that visual and spatial image. I feel that until now, most sound art installations were like that, and Leitner's works can be regarded as the archetype of such installations. In contrast, filmachine is based on a different understanding of sound and space. First there was the concept for generative sound structures, from which the spatial concept of the installation was developed later on.

KS: Carsten Nicolai's 'syn chron' also has that characteristic. But the figurative aspect is stronger.

KA: 'syn chron' is primarily a piece of architecture. Despite the fact that it went through a very particular production process and technological research, it still has a traditional aspect in that it applies archetypal conceptual ideas to sound and light, even though it structures the space in a radical way and links it with light and sound, using the vibration of the structure and its frequency as a visual interface. Nicolai juxtaposed sound and light as equal elements in art. Again, in contrast, filmachine uses sound as a compositional factor of space, and the visual or spatial forms are rather later applied to match its movements.

KS: I had the first inspiration for filmachine during a concert I played at the ICC in 2005. I became very conscious of how to handle highly complex sounds as material. The concert was received well, but I didn't want to go on and create an advanced form of 'Mego' label music. I

thought that, rather than improving my live-performance, there should be a space or medium where my music would fit better. And after toying with many different concepts, I finally created filmachine.

I was particularly interested in the possibility of organizing sounds or their movements in space. For instance, in some musical pieces for orchestra, trumpets are positioned on the second and third floors. In that case, you know, we may come up with the simple idea of creating a kind of longitudinal movement by transferring the 'PaPaPaPaPa' phrase from the third floor to the second. However, such a simple method has rarely been tried.

KA: I once saw a similar attempt when the exciting piece 'No hay caminos, hay que caminar...' (1987) by Luigi Nono was first played in Suntory Hall in Tokyo. On the second floor, in the rear row, the brass section was positioned in a round shape, directed slightly downward. In the case of Nono, as is also evident in 'Prometeo' (1984/85, visual construction by Renzo Piano), the up and down movements of sound are incorporated, but the movement is not clearly articulated, and from this precedent I suspect that it would be impossible to realise with an orchestra what you have done with filmachine.

For instance, as in Leitner's sound installation, or the light installations by British artist Anthony McCall, the archetypal images, sounds, and even light itself, are regarded as single given elements, not as complex or generative structures like in filmachine, where sound is created by software and without a predetermined scope. The structure is elaborate, and so are the sound layers and the composites of movement. To me, the attractiveness of filmachine lies in its thoroughly intricate structure.



## **filmachine/filmachine phonics: A Framework for Open Compositions.**

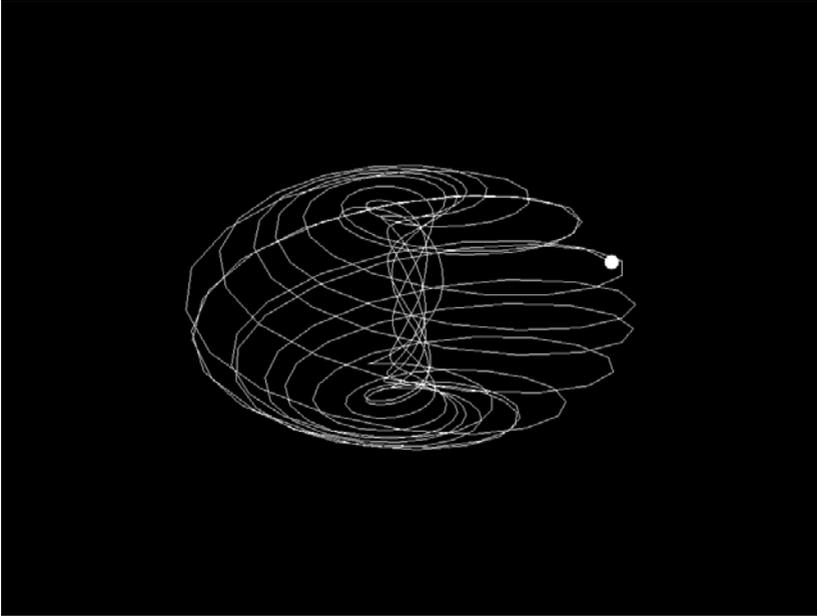
**By Takashi Ikegami, Yuta Ogai, The Graduate School of Arts and Sciences, University of Tokyo; evala, Maria Shibuya, Keiichiro Shibuya, ATAK**

filmachine is the first product of a new principle of sound composition called Third Term Music. In addition to the sound installation, the music is also presented on a CD, which is especially designed for headphone listening. In this essay, we explain the background and the concrete methods of how the sound structures of these two works, filmachine and filmachine phonics, are organised, and how the works are positioned in the history of sound art.

### Musicological considerations

Timbre is the most important issue in modern acoustics. It isn't specific to electronic music, which uses computer technology, but it is of crucial importance in all music. The history of Western music has evolved from non-harmonic to twelve-tone composition, and from twelve-tone to serial music and then on to minimalism. But the issue of timbre appears also outside the history of Western music.

Some composers prefer older instruments and ensembles to contemporary ones, but nevertheless older instruments are less functional than modern ones in precision and speed. The timbre problem isn't a simple problem of precision and speed, but rather is about our human perceptual apparatus. Namely, the question is what we listen to when we listen to music.

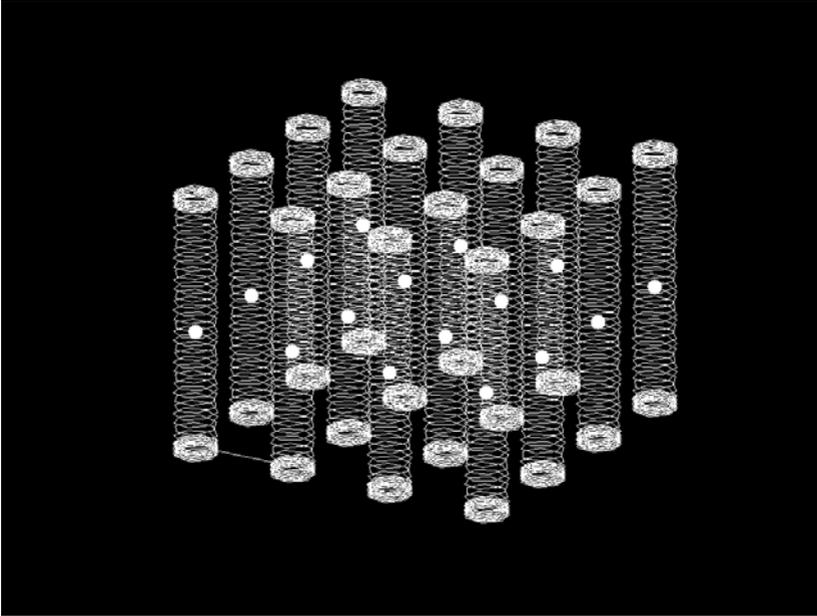


*Fig. 1: Generation of a 3D sound space by using the Lanford attractor. The white ball represents the sound image.*

In the Western way of thinking about music, timbre exists outside the sound structure. The structure appears in the score, and, in order to highlight the structure, timbre has been sacrificed, and its only manifestation is believed to be a result of nothing other than the exceptional maestro. However, the problem of timbre can't be reduced to a simple universal problem such as "what constitutes good timbre?" or "a flash of shakuhachi sound." It is our belief that we have to avoid a dichotomy between timbre and structure to create a new principle, i.e. third term music. The goal of Third Term Music is to go beyond the concept of drone and melody, two fundamental elements of musical composition, and to provide the possibility of a third element such as the composition of timbre and sound dynamics as a meta-framework.

We don't want to merely propose a new method for automatic composition with computer technology, but instead a way to produce a minimal timbre element for composing music. In other words, instead of distinguishing between timbre and structure, we suggest that timbre is a structure, and vice versa. We don't mean 'structure' in the sense of Western style music, but a dynamic and open structure created by chaos, genetic algorithms and other open-ended evolutionary systems. Timbre should be taken from the point of view of technological materialism and should not be taken as a mere effect of performance. From a technomaterialist point of view, we just convert a variety of time series into AIFF files. In this way, we are connecting any structure to music, which is also meant as a critique of standard electronic music in an academic sense.

Making music with a computer is to combine different timbres. If this is true, and when timbre has a structure, computer music can generate unpredictable structures. The acoustic object generated by this method



*Fig. 2: 16 sound images move up and down in spiral movement. This motion structure is perceived as if a sound film or sound membrane is moving up and down. Thus the name filmachine for the installation.*

is releasing music from the concept of wholeness, avoiding a sort of simplicity often found in electronic music. This way of making music is related to an approach of complex systems studies, which proposes that synthesising is easier than describing. All these generative methods make it possible to generate very complex and radically new sound timbres.

filmachine installation

filmachine is a sound installation with a three-dimensional acoustic system. It is a virtual soundscape and a large machine that generates acoustic space, time and motion structures. filmachine is a black spherical skeleton of 24 speakers suspended from the ceiling. filmachine presents streams of sound files, which are controlled by a 3D acoustic system called Huron. The sound is accompanied by flashing and moving LED patterns. The floor is an abstracted landscape, which is composed of black cubes that rise up towards the center of filmachine. The audience can experience the sound of filmachine from various positions within the sphere of speakers.

The acoustic system “Huron” enables us to program the orientation, movements, and location of sound objects in time. The system not only provides an ideal sound experience in a fixed point, but also makes it possible to create a new acoustic space where we can perceive the autonomous movement of the sound stream in a virtual three-dimensional space. filmachine uses various types of objects ranging from variations of spiral motions to strange attractors that appear in nonlinear systems (e.g. Lorentz, Rössler, and Lanford attractors). The sound pattern oscillates between those complex dynamics and within different temporal scales. The Huron system generates a virtual sound localisation by simulating

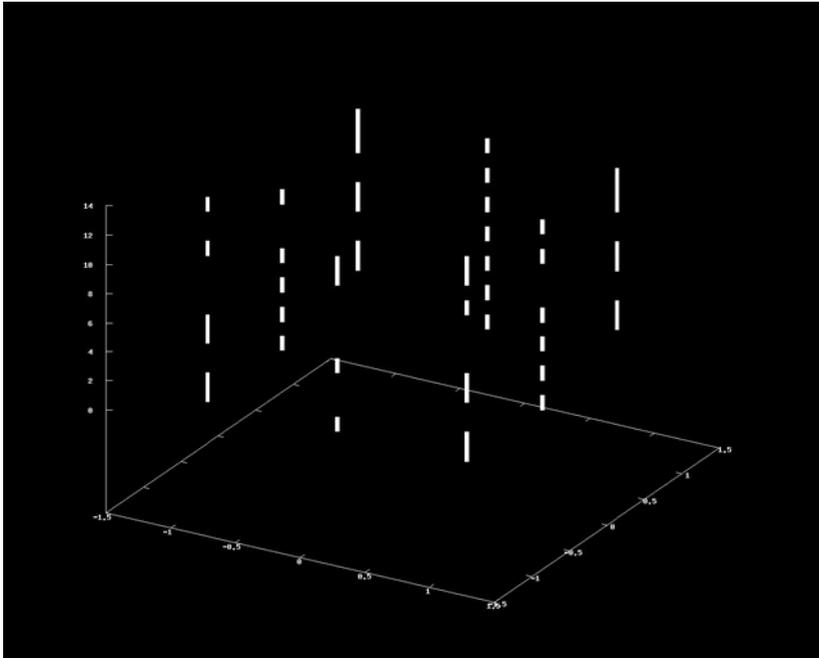


Fig.3: Example of an LED pattern which is generated by CA rule 54.

virtual walls and calculating virtual reflections from these. The algorithm is mainly used for the design of music halls and theaters without actually building them. In our case, we use it for creating free moving sound images without regarding the real speakers' positions. Fig. 1 and Fig. 2 show an example of a virtual movement of sound images in a 3D space. As sounds are moving in space, so are light patterns, which are generated by an LED system. The LEDs are mounted on eight pylons, which are positioned in a square around the circular speaker area. Each pylon is equipped with 14 LED units. The units are displaying complex patterns. For example, particles are falling down from the upper LED unit, in a pattern that is generated by an elementary cellular automata (CA) of rule 54 (see Fig. 3).

Mapping a sound pattern to a movement in space remains arbitrary to a certain extent. In our case we translate the decibel (db) values of the sound nonlinearly and output them directly to the timeline of the movement. As a result, a pseudo jet engine sound, reminiscent of the sounds during take-off and landing, moves upwards and downwards. Slightly different sounds generated by cellular automata sequentially flow alongside the surface of the virtual cylinder. The way in which each sound pattern is combined with its motion in acoustic space, determines how we hear the sound, or the 'qualia' of sound – qualia being a concept from cognitive science referring to the elements that make up our subjective experiences and that cannot be described quantitatively. For example, using the pattern of rule 110, one of a unique class 4 pattern generator of cellular automata, we happened to produce a sound as if a violin was playing in the distance. We then coupled it with a motion rising high up

into the sky, which generates a sound with tragic tone.

filmachine is a sound-installation which uses a three-dimensional acoustic system. At the same time, it is an expression of textures of spatiotemporal patterns generated by cellular automata and other dynamic systems. For example, a kind of weak periodicity and weak chaos, where the pattern only changes gradually, or, at times abruptly. These textures of pattern are the object of complex systems studies. When we try to interpret those patterns in terms of the natural sciences, we can hardly ascribe any meaning to them nor find counter examples in natural phenomena. However those individual patterns are an essential aspect of complex systems studies. Therefore, filmachine is also an important application of complex systems studies, which focuses on the texture of simulations.

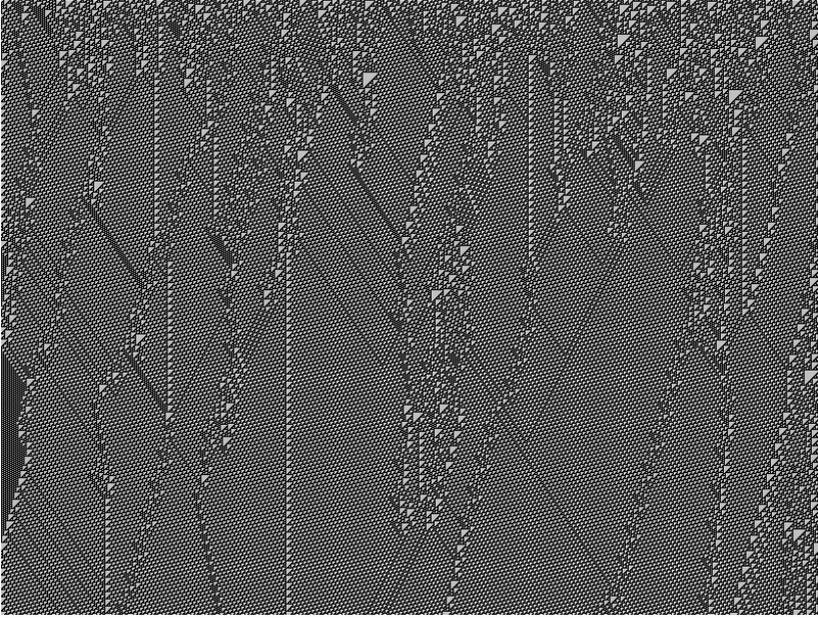
### Sound structures

The sound files are created by combining and modifying initial bit strings by virtual genetic/evolutionary processes. This mechanism to vary bit strings is based on the co-evolution dynamics of Machines and Tapes (i.e. programs of machines like Turing machines) (see Ikegami and Hashimoto 1997, 1996, and Ikegami 1999). This evolutionary dynamic elaborates two kinds of noise, which are fluctuations of bits originating from internal and external mechanisms. That is, sound bit strings are recursively varied by the effect of external noise and by the specifications of deterministic programs. Depending on who reads the tape (or which program rewrites the input string) there can be an immense variety.

In the case of sound file synthesis, a machine rewrites a tape by using the wave form information to increase or decrease pulses, or by using the interference between the intensity of sounds (db) and the sampling

rate. Some other machines receive two input files and let one file act as a programme on the other file. The files can also be combined in a variety of ways by methods used in genetic algorithms. In this way, the initial sound files are developed into unexpected structures as if acquiring life-like autonomy.

Another important time structure of the sound patterns arises from the hierarchical composition of biased white noise, which is generated by a logistic map or by a cellular automaton. Here, within a short time span, time series from those systems have apparent structures and prove their difference from a structure generated by random coin toss. For example, by combining the same white noise from the logistic map but with a slightly different nonlinear parameter, we can generate ample differences for a sensory experience. Cellular automata is a system which evolves in time by updating the state of its cells that are distributed regularly in space. When a cell is linearly arranged (called one-dimensional cellular automata) and the state is 0 or 1, the overall cell behavior has been studied intensively. In particular, they create different spatiotemporal patterns depending on the rules for updating. Especially rules 54 and 110 show unique spatiotemporal patterns, which are neither periodic nor chaotic (see Fig. 4). They are, in fact, uncategorized patterns, which are not observed in continuous space, time and states of dynamic systems. Rule 110 generates particles of different speeds, which rearrange in ways unpredictable from their initial configurations. Rule 54 generates randomly fluctuating raindrop-like patterns. These patterns look neither regular nor random and are classified as "class 4" by Steven Wolfram (see the encyclopedia of cellular automata entitled "A New Kind of Science", 2002). These class 4 rules are believed to have universal computability



*Fig.4: A spatio-temporal pattern of CA rule 110 which uses two states and one neighborhood rule. The system size here is 400 bits.*

and can be found at the edge of chaos, but we don't yet have a clear definition of what they are. On the other hand, the texture of class 4 is apparent. The complexity found in a transient process before reaching an attractor implies the simulation capability of life processes. The texture of class 4 is an anomalous dynamic, which can not be analysed by the usual statistics.

Having had those time series created by either the logistic maps or cellular automata, we transformed them into sound files by our newly developed sound converting software called "sndchanger". First of all, we had to create the text files of sound amplitude from the spatiotemporal pattern. The generation of this text file from a logistic map is straightforward. We simply used the state variables as a parameter for the sound amplitude. In the case of cellular automata, we tried several other ways. We basically used a binary (bit pattern) to decimal conversion to get a floating data set. In the next step, we used the sndchanger to convert this floating text data into aiff sound files. The sndchanger is a reversal sound text converter from/to a text file to/from float 32bit sound files. This software is now available on the web (Ogai 2006).

Using those new complex sound files, we layered them in the NUENDO interface. Collecting a variety of sound files, Keiichiro Shibuya composed the music by considering the affinity and virtual movements between different sound patterns.

filmachine phonics

filmachine emulates a virtual 3D acoustic space with twenty-four speakers fixed in a space. The greater the number of speakers we use, the more easily we can emulate the 3D dynamics of sound images. Yet,

it is difficult to have the same effect with headphones, because we have to generate the upward and downward movement of the sound image using only two speakers. This difficulty was overcome by a novelty in sound technology called the personal surround technology (PST), which is based on the parametric HRTF (head related transfer function) technology. This technology enables us to produce, with a headphone, not only a left-right difference of auditory impression, but also an up-down difference.

The parametric HRTF method was developed by Iida and Itoh in order to effectively and universally realise the sound localisation in three-dimensional space. The algorithm recomposes all or part of the sound spectrum from only one peak and two notches found in the HRTF extracted from psychological experiments. Originally this technology has been developed for mobile phones, but on the “filmachine phonics” CD we used it for recomposing the filmachine sound structures.

It has been thought to be impossible to have sounds move in a perpendicular direction or pass in front of the listener by the use of headphones. However, we think that this is partially due to the lack of 3D composed music. In making filmachine, we have generated sound images that are freely moving and localised in space, and thus cannot be generated by mere panning in a multi-channel environment. Not only does this technology generate a 3D sound effect, but we think, in fact, that the sound images created by complex dynamical systems and evolutionary systems have a marked affinity towards music composition with dynamic sound images in three dimensions.

## Open compositions

There is a unique composition style that John Cage developed at the age of 75, which he called the “time bracket” method. It has no repeated notes on a score, and on top of each note, Cage wrote a special kind of mark to indicate when to start playing the note and when to stop it, using time windows. Sometimes a window overlaps other successive windows. In the scores composed with this method, called the Number Piece series, the qualia of sound changes according to the performer's intention, the timing and the characteristics of the instruments. Based on the same score, the total length of the performance varies. This uncertainty creates a tension between the performer and the audience, which in turn affects the sound process. Music composed on the basis of time brackets is a fragile network of textures in which each texture is loosely correlated with each other. Playing the same note, for example, by a violin, won't hold the same timbre because it usually varies between the beginning and the end of each performance. In this sense, each sound unit, as a constituent texture, has a dynamic structure in itself. In contrast, filmachine strictly designs multi-layered sound files with the precision of one millisecond. But each sound file possesses its own time structure, which is beyond our control. In this sense, filmachine provides a strongly correlated network of textures with no redundancy at all. At first glance, Cage's Number Piece and filmachine appear to be antithetical to each other. However, what they share is their “openness.”

Openness includes “fluctuation” or “autonomy”, a kind of randomness that remains unspecified. In Cage's Number Piece, the width of the time bracket and the inevitable autonomy of each instrument, are the source of the sound's autonomy. In the case of filmachine, the sound's autonomy

is based on chaotic instability, indeterminacy by class 4 rules and virtual motion structures. But there are more than these. Performers of Cage's composition have the freedom to choose when to play and when to finish within a range of the time bracket. The indeterminacy and tension that exists between the audience and the music performers in time bracket music, also exists in filmachine. If what Cage wanted to express was this kind of indeterminacy and open experience, filmachine achieves them by deterministic randomness (of chaos and class 4 rules), and by the observer's embodied subjectivity.

filmachine confronts complex systems studies with a new way of presenting the world. This is not based on storytelling, which means bundling details of an event with a strong intentionality, but uses the integrity of a distinctly textured network, a fine structure of sound timbre at each moment in time, presented as an open system.

#### Acknowledgements of the authors

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All illustrations by Takashi Ikegami.





*Previous page: Takashi Ikegami, Keiichiro Shibuya (hidden), Andreas Broeckmann, Otto E. Rössler, and Kazunao Abe in the installation.*

## Between Recurrence and Variation. Otto E. Rössler in conversation

This conversation took place on January 29th, 2008 in the space of the filmachine installation at the Podewils'sches Palais, Berlin with Otto E. Rössler (OR), Keiichiro Shibuya (KS), Takashi Ikegami (TI), Kazunao Abe, Andreas Broeckmann (AB), Stefan Riekeles (SR).

It is a cold and dark afternoon in Berlin. Some hours before the opening of the transmediale.08 festival, Otto Rössler arrives by taxi. First Shibuya and Ikegami demonstrate their work to Rössler. Then we sit down on the floor of the installation.

OR: Experiencing filmachine, I was reminded of Beethoven's seventh symphony, which is very close to nature, to the nature of sounds. And this installation appears to me to present types of natural sounds, too. I felt both like a baby in the womb and like a whale. Like a sperm-whale in the ocean. And I was reminded of Stanley Kubrick's Space Odyssey and of course of religious motifs. It is very sacral in a sense. The connection between art and religion is also palpable here. But that is maybe too subjective... There is an angel, an angel was present, I could say. Or I could also say Buddha would have liked it. It is impressive to see how people can become incarnations of deep thoughts. And it's for the first time that I had such a feeling again in a very long time. I felt the lonely sperm whale diving 2000 meters below sea level and having to fight with giant octopuses. And apparently they are also very intelligent, these octopuses. The highest intelligences on the planet are fighting down

in the sea. I'm afraid they will be extinct before humanity can really appreciate them. I know they can become persons. That is one of my personal discoveries which might be a dream. They should survive until one of them has been asked his opinion about this piece of art.

SR: Ikegami and Shibuya, you are often referring to the idea of a film in the sense of a membrane to describe the experience in the installation. Could you tell us a little bit more about what you have in mind when you're talking about the membrane? What is a sound membrane?

TI: When we listen carefully, we can experience something like a Doppler effect, although there is none here because the sound source is not moving. The effect is simulated or emulated. There are only 24 real speakers. But we can try to emulate a two-dimensional surface, a hollow sphere. And then, by means of software, make it move up and down. Sometimes this sound object, or surface, becomes ballistic. Like particles of sound that are forming a membrane but that are moving around in a three-dimensional way. Sometimes they form a two-dimensional plane which is going back and forth, penetrating you from above and from the front and from the back. That's the idea, to use sound as micro structures and particles in a transforming, temporarily consistent structure.

KS: Since Debussy and Ravel, it has been every composer's dream to make a sound membrane in a generic sense. That's one of the dreams that composers have. This piece is another embodiment of this composer's long time dream. So actually we are not affected by the Japanese traditional music. It is more international, more universal I think.

OR: There is a question which comes to my mind now, but maybe it's not fitting. I was reminded of Beethoven's seventh symphony, but there is also the ninth. And in the ninth, which is also a very intimidating thing, suddenly there is a voice. There was no voice recognisable to me in the installation here. But I wouldn't have been surprised if the angel had suddenly spoken.

TI: We set up the installation two years ago in Yamaguchi and sometimes the audience said that they heard a human voice.

OR : Yes, one would be prepared to have a hallucination of a voice. Furthermore, the tragedies of the 20th century are palpable. The darkness of the concentration camp. The threat to life. Human beings are the only ones who are aware of the dangerousness of existence. And nevertheless they enjoy it and they have no fear. So one can live through this without fear, which I also found interesting. I wonder if small children would become fearful if they would be inside this space, or whether they would enjoy it. I think they would have to be introduced. Their mother or father would have to take them by the hand. But then they would maybe really enjoy it.

TI: Actually I took my kids, who are four and seven, here.

OR: Oh great! So they are at the age of being wise. Later they lose their wisdom.



KS: Before we started our work on Third Term Music, there were mainly two elements in the European tradition. The first is repetition. Doing the same thing many, many times. And second is difference, like Deleuze said. Do you think difference and repetition are opposite to each other?

OR: I think in music they are complementary. Both are needed. One is needed to get confidence in what is happening. Without repetition you cannot achieve a relationship to anything. You would be lost. There are situations that are important for survival and they are recurrent. There is a recurrent element in any kind of survival. Then there can be other redundancies which are not based on recurrent needs but on recurrent elements in the environment which one can relate to and grow trustful towards. And the other aspect, difference, is like a tender stroke for the soul, a surprise which is pleasing and sometimes frightening. Through the experience of the work, one acquires a personal relationship to the artists, even when one does not meet them in person. Which is perhaps one of the defining features of art. That one is not left alone. It's like metaphysics. The artist is a shaman and a partner. The two of us, Ikegami and myself, have a theory of benevolence. It is related to the dialogical condition of human beings. In this case the artist is stepping back. It's a dialogue between a listener and the artist. But it's a little bit psychiatric too. It's like Weizenbaum's ELIZA, the computer programme that convinced people that there is a person answering their questions, while it was really just an algorithm. And here it is just an artist. But the artist is in this shamanistic position.

KS: Do you think this is true for music only? What are the intermediate forms between recurrence and variations? Something barely changing, something subtle?

OR: Beautiful question. The question is better than any answer. I would have one word, again – benevolence – as a possible suggestion. When you come up with something intermediate, you have the suspicion that it might have to do with communication. And it might be benevolent communication. It could also be frightening. It was frightening to be here. This is why I mentioned religion. My answer to your question would be religion. Recurrence is something mechanical or deterministic. There is one thing that is not deterministic, and that is benevolence. The only thing that is really defying all interests. It is something that should not be allowed, it is against the rules of the market, it's against the rules of society. It is like a lightning which enters, like these lights here, sometimes flashing brightly, coming out of nowhere. This lightning is the difference to me.

TI: Yes, that is repetition and there is a difference. But the point is that we wanted to create a third something. I think repetition and difference is not enough. We need another element for creating art and for our understanding. You can call it benevolence. But how do we design it, how do we introduce it?

OR: We forgot another element in the middle. One could call it attraction or appeal or emotion or orgasm or light. It is that which you need in order to survive. That is because we are affective machines. We have these

attractions, or what Schopenhauer and Nietzsche called the will, Freud called it libido.

AB: Could you say a little bit more about religion and benevolence?

OR: If religion wasn't benevolent it would not be religion. The experience one has here in this room is a little bit like in the bible, the burning thorn bush where Moses had to take off his slippers because he was entering holy ground. This room is a holy ground to me. But I happened to have met the composer and the artists before and so I know already that I will not have to be afraid. (laughs)

TI: What is the difference between benevolence and weakness?

OR: Benevolence is infinitely strong. Weakness is infinitely weak. So it's just the opposite. Benevolence is very dangerous because it makes you vulnerable. If you act benevolently someone could take advantage of it. But that's not the idea. Benevolence is one of the least theoretically understood phenomena. And it is a defining characteristic of human beings. Actually not just of human beings but of any person. This will include artificial intelligence in the future.

A theory of benevolence, which does not yet exist, is related to a theory of cruelty. The only sin is cruelty. The only thing that must not happen in the universe. Benevolence is the opposite. Maybe this way it is easier to understand what benevolence is. Not being let down, having hope. The structure of the world is still such that most people think it is sometimes necessary to have war. This is pathological. Raisa Gorbatschowa, the



wife of Gorbatschow, is one of the very few individuals in history who saw that this is *the* essential virus that has to be overcome. That's why she made sure that her husband took a giant step towards reducing the risk of mutual annihilation of human beings.

AB: Is benevolence something that we experience, or something that we hope for, or is it something that happens between people?

OR: It's something we invent. You cannot prove its existence. It is always possible that there is some non-benevolent reason behind some seemingly benevolent behaviour. So if you wish, the only benevolence that exists is your own belief in it and your own being benevolent.

TI: This is a very central theme and I just want to make it clear. Benevolence in a dictionary sense is a sort of generosity, strength, or robustness. But the way you're using it is a bit different, right?

OR: Yes, it's not about robustness. If one is benevolent, the reward one gets is the happiness of the other. So benevolence is being rewarded by happiness. Wanting to make happy, that is benevolence. If you are a small child and you enter a room like this and the sounds come and you are in the hand of your father, then you know that this is a benevolent environment and it is because *you* are benevolent. Only a benevolent being can understand benevolence. The one who understands is always greater than the one who gives. Which is overturning the relation between the creator and the created. I used to say that the creator is a Buddhist. I have recently developed the fear that Bonobos, which are apes, the

closest relatives to human beings, closer than chimpanzees, might be benevolent. And I have very strange reasons for that, which I'm afraid to mention. Apparently, it is possible to suspect that they know about mutual masturbation. If it was true, then these animals would care about making one another have good feelings, consciously. They would be benevolent. They would be persons. They would have to be given the rights of a person. By the way, I'm also fairly convinced that the sperm whale is a benevolent person. But even Bonobos would belong to the circle of persons. And they might understand the metaphysics of this room.

AB: Why does it worry you?

OR: Because society hates nothing more than sexual benevolence. Because they don't know that benevolence exists. They think that only sexuality exists. And that makes it a commodity. Society is kept in the dark about the really important issues like benevolence. Children are systematically trained to lose it.

SR: You said that the apes and children, of course, and the sperm whale probably, might understand the metaphysics of this room. This room is deeply connected to physical models and modelling techniques like cellular automaton and such. How do the metaphysics of this room relate to the physics of the sound?

OR: It is an interface. This is an archetypical interface in which we are living for a moment. One is of course reminded of endophysics. Of the

theory that we are part of physics. And because we are part of physics there is a cut between some part called our body and the rest. And this interface is where all reality takes place. For example the Now, this moment, doesn't exist in mathematics, doesn't exist in physics, yet it exists for us. This Now is a metaphysical thing. And one could say that this room is an embodiment of the Now.

SR: I would like to know a little bit more about the interface. Which other archetypal interface have you experienced? Do you remember a situation when you could have said something similar?

OR: Something interferes at this moment in my mind. Yesterday I switched on the TV and there was an old German artist, I forgot his name, an ordinary name, he is 100 years old now. He was interviewed and he said, "I am so old now, all I want to do is to give the message of colour back to the people." To him colour had a very similar meaning as this room has for us today. I would say colour is the second example of such a present interface. It only exists in the Now. We have no colour outside the Now. Colour is a miracle. And this miracle of being touched without reasoning is the strange thing. This space here touched us.

TI: I think that's exactly the meaning of making art. Art is something with which you can perceive things that do not exist in the physical world.

OR: So "being touched" would be the common denominator of art and metaphysics.

TI: You know, Otto, after studying chaotic systems and such, I believe there is something more. Sometimes it is very difficult for people to understand what is going on at the frontier of science. Then art can be good because you can understand what is going on without writing down equations or showing some pictures. This experience is always open. It doesn't demand you to experience this or that. The openness is very important. Science is always trying to limit and trying to have exactly one kind of understanding. But I didn't want to do that. That's why I collaborated with Keiichiro.

OR: Yes, it's broad enough. But you see, people like Einstein, if you forget about his sin, knew this too. Science is only good science if it is art at the same time. Strangely, chaos has this influence. Among the scientists, the chaos-people are deep, like Christophe Letellier, a physicist working in France, or Keisuke Ito in Japan for example.

TI: Chaos theory has been developed in relation to visual images. I think it's for sure that vision is the main source of inspiration for scientists working on chaos. But we are working with sound structures. And I think the perception of sound is not so developed.

OR: When I had my first chaotic attractors on the computer, I made a movie of it. And this movie had a soundtrack. So you can listen to the chaos. I had four velocities – times 1, 10, 100 and 1000. So one could listen and look at the attractor moving slowly or fast. And I realised that the sound is very chaotic. And there are different types of chaotic sound. At times 10 it sounded like a motorcycle idling. At times 100 it sounded

like the voice of a horse. A voice that is singing, but the tone is not clear. Three years later I added a movie on hyper-chaos. This sounds like raindrops on the steel roof of a car. A little bit of that experience could also be sensed here. It sounded like hyper-chaos and hyper-hyper-chaos. TI: So maybe sound is much more adequate to characterise hyper-chaos than having it visualised. That is one of the things we have been discussing: that more complex and high-dimensional chaos can perhaps best be described by sound-structures.

OR: Unfortunately, it seems that science is no longer encouraged on the planet, nowadays. Only in fine arts departments can you still do basic science. So we scientists need to have artist-friends.

TI: Yes, you need to have some interface, some nano-wave looking at what we are involved in. Only if you introduce artists into the equation can you get it. Artists have some essential insight into this.

OR: They have a primary access which very few scientists have. If they do, then it's because they are friends of artists.



## Consciousness, Experience, and Unpredictability. Alva Noë and Takashi Ikegami in conversation

Takashi Ikegami: filmachine is an art piece, but for me, as a scientist involved in making this installation, it also provides a unique experimental set-up for understanding consciousness. Both the soundscape and the sound timbre were also computationally generated. Nothing in the installation is natural, but you can still sense how the abstract soundscape expands your sensory experience. In other words, filmachine creates a new metaphor for a 'developmental brain' from an internal observer's point of view. – What was your first impression of filmachine?

Alva Noë: This is a lovely idea – "a new metaphor for developmental brain from an internal observer's point of view." But I think I would approach matters in a rather different way. When you come to the filmachine – or any other substantial piece of art, especially performance art – what you encounter is a new environment. A new space. A new structure. The perceiver's challenge is to bring this new space into focus for consciousness. The new, the unfamiliar is, well, just that – strange, unknown. To know an environment, to know a structure, is to know your way around in it, as Wittgenstein said. So our challenge, really, in the face of a work of art like filmachine, is to learn our way about. So there is learning going on, and there is, in that sense, development. And there is something special and primitive about the encounter with the work of art. But what is being re-created is not the brain, but rather the basic character of our perceptual encounter with the world.

The world is blank at first and we learn our way about in it and so it comes into focus for us as meaningful.

TI: Yes, indeed. That is all about our ways of perceiving the world. But mere strangeness or novelty isn't a sufficient condition for good art or performance. A retrospective element is also a necessary condition. If the environment is too familiar to you, you will stop exploring it. If it is too new, you won't be attracted for long. A mixture of predictability and unpredictability is needed.

filmachine has a virtual soundscape that accompanies only contingent flashing running LED patterns. Also, we generated each element of sound by chaotic dynamics and class 4 cellular automata, which also defy long-term prediction.

AN: Right. I agree. The aesthetic significance of the work is not explained by its mere novelty. My thought was, insofar as the encounter with the work of art affords "a new metaphor for development", then this is because the work of art creates or re-creates the basic situation of our encounter with the world in perceptual consciousness. And so actually I agree with you entirely that what you need for either the world or a work of art or performance to be available, is a mix of predictability and unpredictability.

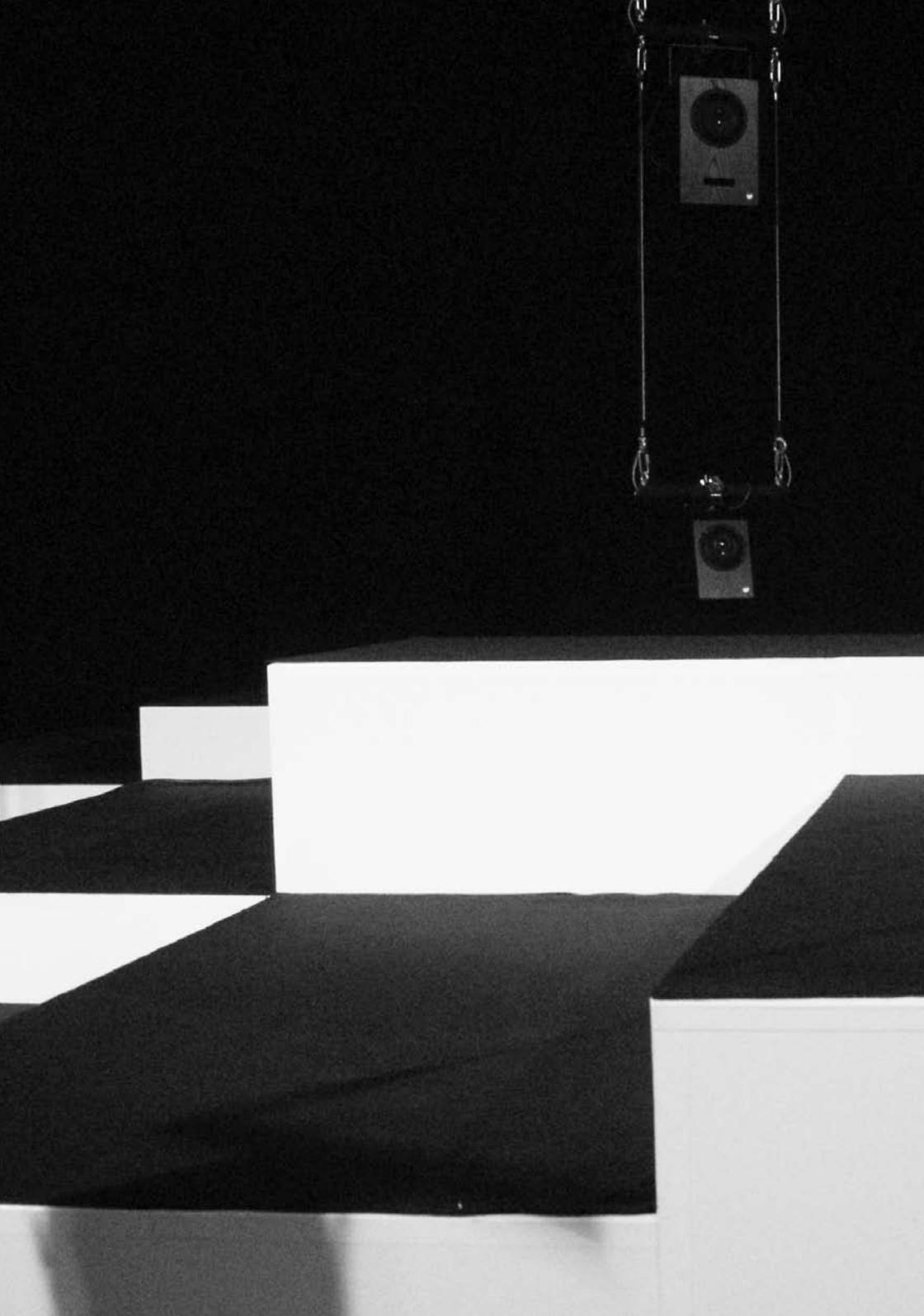
When I visited filmachine, I walked around, I looked, I listened, I got down on the floor on my back with my eyes shut, then I opened my eyes. I paid attention to my sense of where I was and to the way in which my sense of where I was depended on the sound, on the light. I was with my six-year-old son who was thrilled and frightened by the acoustic sensation of

movement – jets whizzing by in the night.

An interesting question: does the unpredictability of the LED patterns prevent one from integrating the experience of the lights with the experience of the soundscape? That is, does the light activity shape or influence the structure we hear?

TI: I think people try to understand or interpret the sound by mapping it onto some known phenomenon, associating the sound of jets whizzing past with the strong white flashes. Actually a part of filmachine was designed to emphasize the impact of the sound by the flashing pattern of the LEDs. However, we also separated the sound pattern from the light pattern in order to make it difficult to have a coherent interpretation. Abstract sensory experience, if such a thing exists, was what we tried to create for, and present to, the audience. So speaking from the perspective of our intention and my own observations, the answer is yes. The light activity can influence the sound perception.

I think memory and experience are very different, and we still don't know how to install a sense of experience, rather than memory, through artificial life. Experience may not be affecting one's conscious states, but it is fostering unconscious states. I think we can only make a machine that creates experience by disabling interpretation.







## Biographies

### Kazunao Abe

Chief Curator and Artistic Director at Yamaguchi Center for Arts and Media (YCAM). From 1990 to 2001, he was a full-time co-curator with the “Canon Artlab” project at CANON Inc. in Tokyo and was involved in various original projects such as “Lovers” by Teiji Furuhashi, "IO\_DENCIES" by Knowbotic Research and "POLAR" by Carsten Nicolai and Marko Peljhan. He has been with YCAM since 2003. He has worked as a producer for “C4I” and "datamatics" by Ryoji Ikeda, “Gravicells – Gravity and Resistance” by Seiko Mikami and Sota Ichikawa, “syn chron” by Carsten Nicolai, “WORLD B” by exonemo, “LIFE – fluid, invisible, inaudible...” by Ryuichi Sakamoto and Shiro Takatani, and others. He was a member of the jury for the “transmediale.06 award” in Berlin.

### Andreas Broeckmann

Dr. Andreas Broeckmann is an art historian and curator who lives in Berlin. He co-founded the art association 'Les Jardins des Pilotes' in 2008, together with Stefan Riekeles, with whom he organised earlier exhibitions at Skuc Gallery in Ljubljana ('KRcF - Room for Manoeuvre', 2006), and at TENT/Witte de With in Rotterdam ('Tracer / Neuralgic', 2004). Independently curated exhibitions include projects at Stedelijk Museum Amsterdam ('Deep Screen - Art in Digital Culture', 2008), Media Art Biennial Seoul ('media\_city\_seoul', 2008), and with Kontejner / MaMa in Zagreb ('Runtime Art', 2004). From 2000 to 2007, Broeckmann was the Artistic Director of transmediale - festival for art and digital culture berlin. From 2005 until 2007, he was an artistic director of TESLA -

Laboratory for Arts and Media in Berlin. From 1995-2000, he worked as a project manager at V2\_Organisation Rotterdam, Institute for the Unstable Media. He is a member of the Berlin-based media association mikro. Broeckmann studied art history, sociology, and media studies in Germany and Britain. He holds a PhD in Art History from the University of East Anglia, Norwich/UK. In university courses, curatorial projects, and lectures he deals with art, technology, digital culture, and an aesthetics of the machinic. He is currently working on a study about 20th century machine art.

## **Takashi Ikegami**

Takashi Ikegami heads the Ikegami Laboratory at the University of Tokyo (Komaba Campus). His research in the area of artificial life and complex systems focuses on evolutionary systems and cognitive developments.

## **Alva Noë**

Alva Noë is a Professor of Philosophy at the University of California, Berkeley. He works on the philosophy of mind and cognitive science, with a special interest in the theory of perception. His work also deals with the philosophy of art, the history of analytic philosophy, Phenomenology, and Wittgenstein. Noë is a member of the UC Berkeley Institute for Cognitive and Brain Sciences and of the new UC Berkeley Center for New Media, as well as a faculty member of Berkeley's Cognitive Science Program. During the 2007-2008 academic year he was a Fellow of the Institute for Advanced Study in Berlin.

## **Stefan Riekeles**

Stefan Riekeles, born 1976, studied audio-visual media in Stuttgart, Germany; New Media in Zurich, Switzerland and Culture Studies in Berlin, Germany. Since 2002 he has been a project manager and curator for transmediale, festival for art and digital culture, Berlin. Together with Andreas Broeckmann, he has curated several other international exhibitions, such as: 'Neuralgic', Witte de With, Rotterdam, Netherlands, 2004; 'Room for Manoeuvre', Skuc Gallery, Ljubljana, Slovenia, 2006. Artistic projects include among others: MobLab – Japanese German Media Camp, Japan, 2005. He has spent several months in Japan for studies and research. He is a founding member of 'Les Jardins des Pilotes', an association to curate, organise and produce exhibitions and festivals.

## **Otto E. RöSSLer**

Otto E. RöSSLer, born in Berlin in 1940, is a Professor for Theoretical Biochemistry at the University of Tuebingen. He studied medicine before working at the Max Planck Institute for Behavioural Psychology with Konrad Lorenz. His numerous scientific publications are in such fields as theoretical biology, theoretical physics, mathematics, philosophy of natural sciences and chemical engineering. RöSSLer is one of the pioneers of chaos theory research.

## Keiichiro Shibuya

Keiichiro Shibuya is a musician who was born in Tokyo in 1973. He graduated with a degree in composition from the Tokyo National University of Fine Arts and Music. In 2002 he established ATAK, which is not only a music label, releasing CDs of domestic and overseas cutting-edge electroacoustic works, but which is also a collective including creators from various fields, such as design and fashion. His first solo album released in 2004, entitled "ATAK000 keiichiro shibuya," was highly praised for its rich sound and a thoroughly elaborate structure focusing on tone and rhythm. In 2005 Shibuya and Ikegami started their collaboration as they exhibited a sound installation work at ICC (NTT Intercommunication Center, Tokyo Opera City) and gave a concert-style presentation to unveil the „The Third Term Music,“ a music theory of sound variation and motion dynamics based on nonlinear sciences. Shibuya's album "ATAK010 filmachine phonics" (2007) and the three-dimensional installation filmachine (2006), made in collaboration with Takashi Ikegami, were awarded an honorary mention in the digital music division at Ars Electronica in 2007. In 2008 Shibuya began working for a pedestrian crossing signal music project, where, as an electroacoustic specialist, he composes music from the viewpoint of urban design, in place of the previously used melody „Toryanse“.

The filmachine phonics CD is available from [www.atak.jp](http://www.atak.jp).





## Photo credits

evala: 24, 26, 66, 72.

Takayuki Ito: 76

Ryuichi Maruo: 42, 44, 45.

Stefan Riekeles: 20.

Michael Sauer: 9, 18, 30.

Keiichiro Shibuya: cover, 86.

Julia von Vietinghoff: 17, 28, 31, 93.

filmachine is a vortex of sound and light. It is a sound installation by Japanese composer Keiichiro Shibuya and complex systems scientist Takashi Ikegami. Three circles of loudspeakers are suspended from the ceiling above an abstract landscape. A delicate composition of space and time gives rise to an imaginary aural space in which sound objects and sound membranes are circulating, at times within an intimate proximity, at other times at a great distance.

This book offers reflections and discussions about this groundbreaking work of art. The essays outline the artists' ambition to change the way we think of music, and offer insights into a unique dialogue between art and science. With contributions by Alva Noë, Otto E. Rössler, Kazunao Abe, Keiichiro Shibuya, Takashi Ikegami, and an introductory essay by Andreas Broeckmann and Stefan Riekeles.