The Hand in the Web: An Interview with Michel Waisvisz

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The following interview was conducted in Marseille, France after Michel Waisvisz's first presentation of the Web was given there in December, 1989. Waisvisz is well known as the developer and virtuoso of several live systems, including The Hands, a novel performance interface based on hand-mounted sensors. He is the Director of STEIM and composer of the recent works Touch Monkeys and The Archaic Symphony. Two examples of The Hands in performance are recorded on New Computer Music (Wergo CD 2010-50).

**Krefeld:** What do you consider yourself in the first place: an inventor of musical instruments, a composer, or a performer?

**Waisvisz:** A composer—a composer of timbres. Due to the state of technological developments in the current era, I’m a composer using electronic means because of their differentiated and refined control over timbre. “The current era” has lasted 36 years. I was four when I started playing with my father’s shortwave receivers. In my view, the term “electronic music composer” implies being a performer as well; you cannot sit behind a desk and write electronic timbral music without hearing it. Aside from this, serialism has taken many of us away from composing by ear. I think that a composer has to be able to make immediate compositional decisions based on actual perception of sound rather than making decisions derived from a formal structure that—as happened in serialism—tends to drift away from our pure musical needs. Composers must go back on the stage and listen and think; they must work and perform where the music actually reigns.

With respect to the inventor role, I consider the creation of a specific electronic music instrument as being part of the compositional process due to the high modular flexible setup of MIDI instruments—and especially the possibility of assembling MIDI controllers out of a toolbox, as developed at STEIM. The way a sound is created and controlled has such an influence on its musical character that one can say that the method of translating the performer's gesture into sound is part of the compositional method. Composing a piece implies building special instruments to perform it as well. The inventor role is thus an integral part of composing. Your question suggests divisions that don’t exist for me; I cannot see a personal involvement in the technical functionality of the instruments and performance as separate from the work of composing, so simply consider me a composer.

**Krefeld:** The instruments you have developed over the years—the Tape-puller, the Crackle synthesizer, The Hands, the MIDI-conductor and your current work on the Web—all work in real-time and all create a direct and continuously sensed contact with the electronic circuits. Don’t you think that computers are more precise and reliable music performers than humans, some say one can even add the human touch to their programs?

**Waisvisz:** I see the hand as a part of the brain, not as a lower instrument of the brain. Of course, you can see a hand as a transmitter and sensor, but in the consciousness of the performance, the hand is the brain. You can’t say that its precision is surpassed or even equaled by computers because we simply don’t know what we control in detail when we play an instrument. Every instrumentalist can tell you that in the instrumental learning process, there are hours of meticulous motoric memorization of timing and intonation, but the thing called music finally comes out as something on top of that. I don’t think this notion is something metaphysical or a romantic vagueness. I think that the slight aberrations from the score—sometimes considered errors—contain crucial micro-information.
that gives music its life. I cannot tell you exactly how that information needs to be categorized,—some Africans and Indians can—but I know it's there, and I also know that when you build an instrument, it must be sensitive enough to capture and transfer these aberrations. I remember a radio broadcast of a Crackle synthesizer concert some 15 years ago, at the time when live electronic music was almost unknown in Holland. Later, a woman came up to speak to me after a concert. She had heard the radio program and told me she had thought it was performed on acoustical objects; now that she had seen it, she believed it was electronics. I think that the fact that so much of my motoric information had reached the instrument through the Crackle fingerpads was responsible for making the electronics sound acoustical—at a time when the notion of electronic music was still connected with the sterile sound of automation and the eerie reverberant sonic beep-aura of early, space-age movies. So I don't know what human touch is. I think that it's an expression used by musicologists to escape from their own formalist trap.

Instead of musing on whether a computer is precise, reliable, or capable of invoking the human touch in music, you should focus on the notion of effort. Effort is something abstract in a computer but a human performer radiates the psychological and physical effort through every move. The creation of an electronic music instrument shouldn't just be the quest for ergonomic efficiency. You can go on making things technically easier, faster, and more logical, but over the years I have come to the conclusion that this doesn't improve the musical quality of the instrument. I'm afraid it's true one has to suffer a bit while playing; the physical effort you make is what is perceived by listeners as the cause and manifestation of the musical tension of the work. One cannot compose the musical tension structure uniquely by formal rules, you can only compose for it. A composer can create the inspirational structure in which performers can find the most economic distribution of their efforts and relaxations. Basically, however, it's a fight with the instrument—always leading to permanent malformations (for example, with violinists' necks)—that luckily most of the time exceeds the formal structures into the occurrence of this wise and vibrating ghost that we call real live music.

Krefeld: So you advocate a more physical approach of the up-to-now highly intellectualized field of electronic music, especially computer music?

Waisvisz: I don't think I made my point. I say "physical," and you mean "more physical." I'm talking about establishing a balance between formal structure and the physicality of the person performing. Once one takes formal structure as a synonym for the beauty of patterns, cold reasoning, a law-abiding mind, and dogmatic thinking, and one interprets physicality as wild emotion, instinct, sensuality, eroticism, and feelable matter, then a historic intellectual conflict is perpetuated! The balance between structure and physicality is the most intriguing one I can imagine because one attempts to weigh out two highly contradictory but crucial entities. The composer who can handle these extremities is bound to create a lively piece of music.

You mentioned "computer music." I'd rather use the more generic term "electronic music." The term "computer" creates so many expectations. Just consider the notorious question of whether or not a computer can compose—can be creative. The point is that so many humans—and unfortunately also composers—behave like robots all the time. So why this critical question aimed only at composers? As long as people ask this question they prove they have a basic misconception about the nature of creativity. As long as there are bad composers you may say that computers can be highly creative.

Krefeld: But you seem to use computers all the time.

Waisvisz: Yes, for translating hand and finger movements into controller information, and—most importantly—to route this information through a pattern of conditions to various sound synthesizers and to store sounds, short motifs, all sorts of patterns, names, addresses, letters, etc. But I never use computers to make musical decisions, especially in time-related matters. The closest I get to using the computer in the decision-making area is as a personal oracle. Over the years I have created an oracle program that I can consult about musical and sometimes more worldly matters. It remembers my questions and I feed back my experiences. Even though I
know how this program reasons—or to be frank, about how this computer system is not able to reason at all—the huge amount of information, accumulated by the program into brief jumpy sentences, creates surprising material that I often use as an injection into my own stiff thinking. When it's really "in tune," it responds with crackling, voice-like sounds that must come straight from Delphi.

**Krefeld:** You have now worked for several years with The Hands—a computer music controller. Tell me about your experiences. Many good things have been said about The Hands. Did you discover limitations?

**Waisvisz:** Oh yes! The Hands is really difficult for other people to play. This is not just because the synthesizers are made to fit my own hands; it's also because the way one approaches the synthesizers through The Hands is heavily influenced by my timbral conceptions. I'm not exactly the Carl Orff type of person who likes to create an army of followers who share my views and become adept at playing The Hands. However, Frans de Ruiter, the director of the Royal Conservatory in The Hague, which is housing the department of Sonology, encouraged me to do a research project supported by the institute in which a more generic version of The Hands is being developed. We call it the MIDI-conductor—an instrument that uses the same technology as The Hands but is easier to use. Through the use of an extension of STEIM's Lick Machine software, it can be programmed for timbral performance and refined MIDI sequence-file manipulation on stage. Students and friends are happily volunteering as test subjects and interested people are welcome to try it out and contribute to the project.

**Krefeld:** But what about your personal experiences with The Hands?

**Waisvisz:** Three years ago we decided not to do any further developments on The Hands in order to start the musical phase of the project. It was time to learn to play the instrument, to try to overcome its limitations, to forget about technology, and to enter the musical domain. Happily, I have done this, especially when I toured with my composition *Touch Monkeys*. I ran into trouble, however, while working on the composition *The Archaic Symphony*, in which many synthesizers were to be controlled in order to create a complex set of timbral layers. This could only be accomplished by using a computer system that could reinterpret the MIDI-messages coming from "The Hands." This software is what became known as the Lick Machine, and I developed it in close collaboration with STEIM programmer Frank Baldé. I would describe the Lick Machine software as a MIDI macro program. Any incoming MIDI message can become a trigger for one of the previously stored sequences of MIDI messages. These sequences can be a group of multi-channel program changes, a sequence of notes, a sequence of system-exclusive messages, or a combination of MIDI messages. Once these sequences are running, they can be manipulated immediately by incoming messages from The Hands. This allowed me to conduct the many layers of the work simultaneously by connecting the different parts of my gestures to the various transformation options. The word "conducting" does not cover the extensive timbral and time-molding possibilities of the software. In the Lick Machine software, we made our first attempt to have The Hands control the pattern formed by a bundle of MIDI messages instead of separate parameters. Thus one is able to operate at a higher level, closer to the parameters of the composer, and closer to the ear.

**Krefeld:** What do you now consider the most useful function on The Hands?

**Waisvisz:** The scratch mode. This mode retriggers any held-down key on each change of distance between the left and right hands. One is able to re-trigger a note 255 times by moving The Hands far apart. The distance between The Hands can be translated into a value for any of the MIDI message data bytes. In *Touch Monkeys*, the extensive timbral modulations were created by assigning the distance value to the key velocity value for the selected notes. The FM sound patches on the Yamaha synthesizers we used were specially programmed and made to respond with high sensitivity to the velocity data. In fact, the notes follow one another so rapidly that one can treat this chain of notes as a sort of real-time granular synthesis. While the fingers do crude selections, the bowing gesture of the two hands turns out to be a very precise way of manipulating timbral parameters.
Krefeld: You have recently stated that STEIM’s research activities will move away from MIDI.

Waisvisz: Yes, we have created enough MIDI tools. We will be able to help composers, musicians, and sound and light engineers with most of their demands by applying our MIDI controller toolbox. This is a portable computer with analog sensor inputs that can be programmed from an external computer in advance and then taken on the road together with the controllers and the rest of the set-up. We want to pursue our original policy of creating extremely personal musical instruments. We believe we contribute more to the possible future quality of electronic music by allowing individuals to make an intensely personal statement, instead of pretending to serve everyone and coming out with dull, middle-of-the-road stuff that makes everyone sound the same. Apart from that, the industry still believes in high technology while we think that appropriate technology is more reliable and easier to modify by the composers themselves.

Krefeld: Although you are involved in research projects at the Institute of Sonology and STEIM, it seems that your personal research is fully concentrated on The Web. What about The Hand in The Web?

Waisvisz: The Web is my first attempt to create a simple instrument to manipulate textures. Timbre has continuously changing patterns. Because of the rather simplistic way synthesizers have been designed until now, we were forced to manipulate the timbres by single parameters—parameters derived from a theoretical, analysis-based model of sound. Now that we can apply digital signal processing technology to sound synthesis, it’s easier to manipulate an electronically generated timbre through a complex pattern of inputs. I built a mechanical Web in which each segment has its own tension sensor. When you apply pressure with your hand on one of the segments, the tension of the neighboring segments is influenced as well. Actually, the change of tension is distributed mechanically through the whole Web. The pattern of tension of The Web as a whole is changed. Thus The Web is a mechanical computer [saving precious digital computer time!] that functions as an input sensor. Each segment represents a variable in the input section of the synthesis software. A change of the pressure-tension pattern in The Web will create a whole series of related changes of the variables at the inputs. In the first experiments, no functional connection scheme was designed for the relationship between the specific input parameters of the synthesis system and the segments of The Web. Even then, it was amazing how easy it was just to grab the strings of The Web, move the segments, and hear immediate complex timbral changes. I had other musicians with no theoretical knowledge about the system play it, and within a short time they were empirically able to master an astonishing amount of control over the timbres.

Krefeld: Will you dispose of The Hands and play The Web from now on?

Waisvisz: I think The Web will be a source of inspiration for improving The Hands and other instruments I will make in the future. I want to pursue three lines of further development of The Web. I want to create different sizes of Webs: a very small one to include in instruments like The Hands or to replace the wheel sections of existing keyboards; a zither-sized one to be played as a hand-held string instrument; and big sizes to lean on and possibly even to climb into.

We will have to design software and some hardware first to create a pattern library for The Web. When you start playing The Web you tune the radi- als to the tension that gives you the most useful mechanical feedback. When this is done you assign through software the value zero to all of the segment tensions you have set up. When you start squeezing The Web with your hands and you create a pattern that you like, you push a foot switch, which stores this pattern under a button that is part of an array of buttons located on or near The Web. The next time you press one of these buttons, it will recall the pattern stored under that button, and this will be the new starting point for all of the segment tension values. When you touch The Web again, you start modifying the pattern you just selected, and this can be stored again. I also want to be able to recall each of these patterns by touching a different segment of The Web. This way one can interpolate between patterns and navigate at a high level through the patterns. Strangely enough, play-
ing it actually feels as simple as playing with different acoustical objects moving them near—or against—each other in order to hear how this makes the sound change. With electronics used for sound synthesis, you can select and design the relationship between the mechanics of the instrument and the timbre it produces.

The third type of Web research I want to do is not based on a mechanical analogy of The Web but on The Web consisting of an array of pressure-sensitive buttons. Here the software will simulate the tension relations between the buttons. The button you press becomes the center of a small community. There are neighbors of different proximity. The pressure value flows over to the neighbors of the first order and then diminishes over the next orders. You can also have relatives farther away; this is to allow The Web software concept to be implemented on standard MIDI-controllers. One could map a neighborhood of Web relationships on an ordinary MIDI-keyboard if it were equipped with a polyphonic key pressure output. By using a pattern of buttons, more flexible control over output textures could be established, because you would not be limited by the mechanical structure of the Web which is constructed out of strings. Now it would be the software that creates the relationships between the hot spots. The Web concept seems to lend itself to application as an input structure for parallel processing, for instance neural-nets (I can imagine making neural Webs!).

**Krefeld:** Do you intend to control more composition-level parameters with The Web as you do with the Lick Machine?

**Waisvisz:** For the time being, I see The Web mainly as a timbral controller, although the boundary between manipulating timbre patterns and composition might disappear unnoticed.

**Krefeld:** Why are you so interested in timbre?

**Waisvisz:** Timbres are around us all the time, but there is still no universal way to describe them. Nor is there a notation system, which relieves us from a boring reproduction culture. It is an unknown area. Sounds travel deep inside us and itch at places where we can’t scratch. This stirs up my curiosity. Also sounds without any apparent melodic structure trigger my imagination and create strong musical desires, sometimes sensual and erotic. Sounds have their own meaning and place in relation to each other. When composing, I often know exactly which timbre is needed without being able to justify it in words.

**Krefeld:** Looking at your record and CD collection you seem to listen to vocal music a lot.

**Waisvisz:** I rarely listen to electronic music. I like to browse through the genres—Olivier Messiaen, Antonio Vivaldi, Orlando di Lasso, Peter Gabriel, Eric Dolphy, Leos Janacek, Jimi Hendrix, Emma Kirkby, Barry Truax, Nusrat Fateh Ali Khan, Johnny Dodds, Alfredo Gutierrez—and I’ll get deeply involved in one of them for a while, but through the years I still get excited listening to voice music from Mongolia, Sardinia, and Albania.

**Krefeld:** We haven’t spoken about your musical aesthetics.

**Waisvisz:** The most compact description of my aesthetic rules for a composition is the performance itself. A work of art is the shortest description of its own aesthetic rules.

**Krefeld:** In your opinion, who are the most important electronic instrument designers?

**Waisvisz:** Leon Theremin, Dave Simmons. This is mainly because of the immediacy of their instruments. Theremin’s instrument takes care of the horizontal gestures and Simmons of the vertical ones. The mechanics of the relationship between the performer and the instrument are not visually concealed; it is bright and ultimately simple. It’s up to the performer to make something out of it. If Karlheinz Stockhausen, who in the European version of the history of electronic music is considered to be the pioneer, had started his electronic work with Theremin instead of with Meyer-Eppler’s sinusoidal additive synthesis, then the synthesizer industry wouldn’t be so musically retarded these days.

**Krefeld:** How can we prevent this from happening in the future again?

**Waisvisz:** We cannot, probably. I would humbly suggest that information shouldn’t be monopolized in stupid rat races among music institutions, industry, and individuals. Musicologists should feel more responsible for transferring as much knowledge as
possible to the next generation instead of trying to become overcreative artists in explaining what art means.

**Krefeld:** Do you expect composers such as Stockhausen, Cage, and Boulez to have a lasting importance?

**Waisvisz:** They have been so involved in their New Music revolution that they haven't exactly been the caring fathers the new generation of composers could have used. Although they have liberated the field from a lot of the old dogmas, some of them have become rather frustrated because of a lack of respect from the younger generation and have become enlightened musical tyrants. In contrast to what a lot of the younger composers think, I believe that John Cage is the worst in this respect. Cage has pleasantly infiltrated the minds of many young North American composers—not just because he plays this guru role so modestly. (It seems that a lot of North Americans are so sensitive to this approach.) He is determined to rule in this invisible, not openly aggressive, manner, whatever freedom he gives a performer, or whatever random procedure he applies. Also, we know now that random isn't as random as it used to be; it always sounds like Cage's music, which is high quality manipulation. He represents the soft form of total control that Aldous Huxley describes so well and that I consider the most dangerous. Stockhausen is more Orwellian, this form of small-scale tyranny creates victims as well, but fewer in number. Also the egocentric character of this form of tyranny often inadvertently leaves more room for rebellion. So for the younger generation he is a less destructive father. Sill Stockhausen's *Telemusik*, Cage's early *Imaginary Landscape* (the one performed with RCA test records), and my mentor Dick Raaymakers' *Kanons* are among my favorite electronic music compositions.

**Krefeld:** What is the future of electronic instruments?

**Waisvisz:** Apart from frequent sentimental revivals of ancient acoustic instruments, I think electronics will integrate fully with acoustical instruments and vice versa. I'm hoping to witness the time when we will be able to manipulate matter electronically. Then one will be able to combine all the qualities of electronic control with the superior timbral qualities of acoustically generated sound. It basically would redeem us from the use of loudspeakers. I imagine an object that is vibrating because of applied energy has a shape that can be modulated and a surface structure that can be granulized, fluidized, or just hardened, and how rich timbres become directly audible from all surfaces of the object, in all directions. I imagine that I can put my hand in The Web and pull, the object opens, and that higher sounds shriek in the air when I stick my hand in it.