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An Interview with Hans Tutschku

Born in 1966, Hans Tutschku began to study music at an early age. In 1982, he joined the Ensemble für Intuitive Musik Weimar, playing synthesizer and live electronics. He studied electroacoustic composition in Dresden, The Hague and Paris, and between 1989 and 1991 he accompanied Karlheinz Stockhausen on several concert tours to study sound diffusion.

As a member of the Ensemble für Intuitive Musik Weimar, Mr. Tutschku has realized multimedia productions, including those involving projection of images and choreography for dance. The ensemble has given numerous concerts in Europe, Latin America, and Asia. He has composed instrumental works, works for tape, works for musicians and electronics, and music for theater, film, and ballet.

During 1995–1996, Mr. Tutschku was the professor of electroacoustic composition at the Liszt Conservatory in Weimar, and in 1996 he attended the Royaumont composition workshop with Klaus Huber and Brian Ferneyhough. During 1997–2001, he taught computer music at IRCAM. He has given master classes at the Universities of São Paulo, Buenos Aires, and Singapore, the Music Academy in Budapest, as well as in Darmstadt, Stuttgart, Florence, Milan, and Porto. He has served as a jury member of the CIMESP (São Paulo) and Métamorphoses (Brussels) international competitions for electroacoustic composition.

He completed a D.E.A. degree at the Parisian Sorbonne and a Ph.D. in Composition at the University of Birmingham in the UK. He has taught electroacoustic composition at the conservatory of Montbéliard since 2001. Last summer, he held a DAAD professorship at the Technical University of Berlin. He is the recipient of several international composition prizes, including Bourges, Hanns-Eisler-Preis, CIMESP São Paulo, Prix ARS Electronica, Prix Noroit, and Prix Musica Nova.

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This interview was conducted on 2 April 2003, at the Ecole Nationale de Musique in Montbéliard, France.

[Editor's note: Hans Tutschku's composition for 5.1-channel playback *Migration pétrée* can be found on the sound examples portion of the DVD accompanying this issue.]

Nez: How did you get started composing and working with electronic music, and how did growing up in East Germany affect your musical development?

Tutschku: I started by playing the piano. As my parents are musicians, it was obligatory. When I was 15 years old, I met a musician, Michael von Hintzenstern, who introduced me to an analog synthesizer, which was a very rare thing in East Germany at that time. I actually attended a concert where he used the EMS synthesizer. So I asked him after the concert if he could show me how it worked, and he loaned it to me for two days. I brought it back and said, "Thank you very much." He said, "No, now you show me what you did!" This was the starting point of our collaboration, which by now has lasted more than twenty years.

After a very classical education, this was really a door-opener to a whole new sound-world. He introduced me to a lot of music, for example Henri Pousseur, Schaeffer, Stockhausen. He had been in touch with Stockhausen since the early 1970s. This was, I would say, a turning point in my musical education. Very soon, we started to improvise and perform concerts together.

Nez: Did you then form the Ensemble für Intuitive Musik?

Tutschku: The ensemble had already started a year before I joined them and had given two or three concerts. But this was really the starting point of the Ensemble für Intuitive Musik.

You ask how being in East Germany influenced me. The technical possibilities were very limited. Michael received the EMS because he had won a composition prize in the late 1970s, and as a result

could go to Switzerland for three months to study. He had friends who helped him to obtain this synthesizer. This was a really a very uncommon situation for us composers in East Germany, having this little box and being able to listen to West German Radio (WDR). Because Weimar was not far from the West German border, we received WDR programs. We listened to what was going on. In the 1980s, when FM synthesis came out, we listened to this and tried on our analog machine to reproduce the sounds we had heard resulting from other techniques which were not available then to us. I would say in general that these technical limitations always pushed us to go to the extremes with existing material, to explore more than what the machines were built to do.

Nez: Stockhausen was a key influence on your personal development and on that of the Ensemble, which in its early days played a lot of music of censored East German composers. Could you describe these experiences?

Tutschku: In East Germany, the musical politics were very defined in terms of a social realism. Stockhausen, Cage, West German composers, and Western composers in general were not played very much. There were some bigger festivals, as in Dresden or Leipzig, which provided possibilities for performing their music, but not very much.

We worked a lot on Stockhausen's intuitive music, and we were very much in touch with him, but just by letter, of course. He sent us recordings, scores, and books. We had the opportunity to study his music in detail. We tried to defend this kind of music and played it, mainly in churches, because this couldn't take place in the main concert halls.

This music wasn't really improvisation. These so-called text compositions from the late 1960s and early 1970s are more than improvisations. They are the "tuning" of musicians into a framework . . . a form and aesthetic thinking. It is a very guided improvisation . . . an improvisation that was very often misunderstood. Just taking the texts and playing them is not the best way of interpreting them. Probably for that reason, they are not much played these days. You really have to interpret them as Stockhausen wanted it at that time. As with medieval music, you can't just play the notes. These intuitive texts by Stockhausen must be interpreted within the cultural context of his own aesthetics. We had the chance, after the political change, to rehearse these pieces with Stockhausen at his place in Kürten in 1991. Those were very inspiring days for us.

Nez: What are your current projects with Stockhausen?

Tutschku: As it is his 75th birthday this year, we are doing a whole series of concerts of his music in Germany in May. There is also a project, not yet scheduled, to perform a block of his intuitive music during his annual summer courses in Kürten.

Nez: How does the Ensemble work together?

Tutschku: As the pianist and I are both composers, most of the musical structuring comes from us. Sometimes I'm more responsible for one piece, and sometimes he's more responsible for another. The other two improvisers do the "phrase work." I give suggestions, and then the ornamentation, let's say, is done by the other two. If you play for such a long time together, you develop, without knowing it, a common catalog of aesthetic possibilities. We fly in someone from the outside who comes with very different ideas—a dancer, a painter, or another artist. Without discussing much, we do something together and try to be sensitive to each other, to figure out what we can do together.

Nez: You and Jacopo Baboni-Schilingi, the other composition faculty member at Montbeliards Ecole Nationale de Musique, are part of PRISMA, a group of researchers and composers. In its recent publication *PRISMA 01*, this group describes itself as dedicated to the research, production, and teaching of "music founded on complex formal structures yet still accessible to emotion . . . [supporting] an aesthetic and practice that simultaneously articulates 'constraints' and 'freedom' as the foundations of a relationship between 'rule' and 'invention'." How would you say the music and research of PRISMA differs from that of others today?

Tutschku: I would say that the PRISMA group is a free agglomeration of composers willing to share

Table 1. Compact disc recordings featuring Hans Tutschku

2000	*IMEB Compendium International 2000 Bourges*
2000	*MOMENT* (Empreintes Digitales)
2000	*excitations* (Empreintes Digitales)
1998	*Prix ARS Electronica Linz 1998*
1998	*Ausbruch Aufbruch* (DegeM-CD04)
1998	*Prix International Noroit* (Léonce Petitot)
1995	*CIMESP São Paulo*
1994	*Ausbruch der Klänge*

their research. This is different from other institutions, because an institution always has a political image to defend, which also imposes, as many of these bigger institutions clearly show, a musical aesthetic. This creates a filter eliminating composers and musicians who do not fit the self-image of the institution.

What we—mainly Jacopo—want to do is to give a platform for composers who grew up with musical informatics as well as with sound treatment and computer-aided composition. Because now there is a generation who has worked with these, who grew up using these tools, we have come to a point that a new aesthetic discussion becomes possible. This was not the case in the 1980s and 1990s, when a lot of these tools were used just because they were available. I think at that time there was not enough critical questioning of the tools being used. All of the composers who are part of this group—and this is not a fixed thing, because anyone who wants to join this exchange of ideas is welcome—everyone develops tools for their own compositional needs. They are all involved in teaching, and are, of course, all active composers.

We discovered that if one composer speaks about their recent research and shows what they are trying to figure out or what some of their main points of interest are, there will be at least two or three others working on the same issues. What we want to give is a platform, a possibility of exchange, for many composers who find themselves facing the same problems. By sharing our research, we can advance in a common direction, which does not mean that all the composers using these similar tools write with the same musical aesthetics.

Nez: Could you describe your collaborations in theater, dance, and film?

Tutschku: In my childhood, I followed two parallel paths: music and theater. I started to study theater in Berlin, which at a certain point I abandoned for music, but I never regret that I studied acting. I am very much attached to other forms of expression. Even if I don't go on stage any more as an actor, my musical thinking is very much influenced by gesture and movement. You can see this in analyses of my instrumental and electroacoustic pieces: sound structures, melodies, and instruments, for example, play the roles of characters. Collaborations with other artists is something very much integrated into my musical thinking.

Nez: Tell us about *La Finale,* a recent theater collaboration.

Tutschku: *La Finale* was a project by Sylvain Prunenec and percussionist Françoise Rivalland. I know Françoise as a very fine percussionist and improviser, as we had performed concerts together before. She asked me if I would like to join them for this project. Everything in the musical part of *La Finale* was teamwork. This was not a situation of there being a composer and instrumentalist. All her playing is miked and treated in real-time by my electronics. We held long recording sessions together, and recorded isolated sounds as well as musical phrases. These went into the samplers I play during performance.

Nez: This leads me to asking about your composition and research, including that of physical modeling.

Tutschku: I first learned about physical modeling by looking at the Modalys software at IRCAM. That's something I've always done. If I'm in front of a new program, or a new working environment in general, then immediately I start a piece. I don't want to learn a program just to learn about its possibilities. I start immediately with a musical idea. This is constraining, because my musical ideas are often disconnected from the real possibilities of the program, which I don't know yet! But my musical creativity is very stimulated by this conflict.

Nez: What did you use for the physical modeling in *Eikasia*?

Tutschku: I used Modalys and immediately wrote a lot of Lisp software to drive and control it. Up until then, I did not know if there were many other complete works composed using this program, just example files, which were not very convincing. I developed a complete library in OpenMusic, a Lisp-based computer-aided compositional program at IRCAM. So instead of writing code directly in the Scheme dialect of Modalys, my Lisp library operated at a macro level and generated the Scheme code.

The idea in *Eikasia* was very simple. The easiest objects to obtain are strings and plates. The whole piece deals with plates tuned to spring spectra, and strings tuned to plate spectra. I mixed analysis and synthesis. I analyzed low piano strings with very rich spectra and tuned all the vibrating modes of circular and rectangular plates to the spectrum of the piano and vice versa.

Nez: Regarding your interest in gestural control of dynamic sound treatment, what was the process of development leading up to The Monster? The first time you used it was for your piano piece *Das Bleierne Klavier*.

Tutschku: The Monster (see Figure 1) is a sort of mega-patch in Max/MSP which has its roots in the 1970s analog synthesizer of my past. All treatments were organized in modules without any interconnection. There was no predefined order. You can first take a oscillator, then a filter, then a ring modulator, and then a reverb. Or you can first take a oscillator, then a reverb, etc.

What I wanted was to recreate with The Monster was a toolbox where all the modules are independent and can be interconnected in any order . . . in parallel or in serial. The working method is to patch modules together and build out of that a certain treatment configuration as a starting point.

The Monster became necessary, because throughout the years I developed many different sound treatment algorithms that were linked to a specific composition, performance, or improvisation. At rehearsals with the Ensemble für Intuitive Musik, I would often get an idea, but just then I couldn't start to program, of course, and say to the musicians, "Now, wait a second, I need a half hour to make a new Max patch." I wanted a sort of "hyper" Max patch, an engine that contained all previously developed sound treatment possibilities.

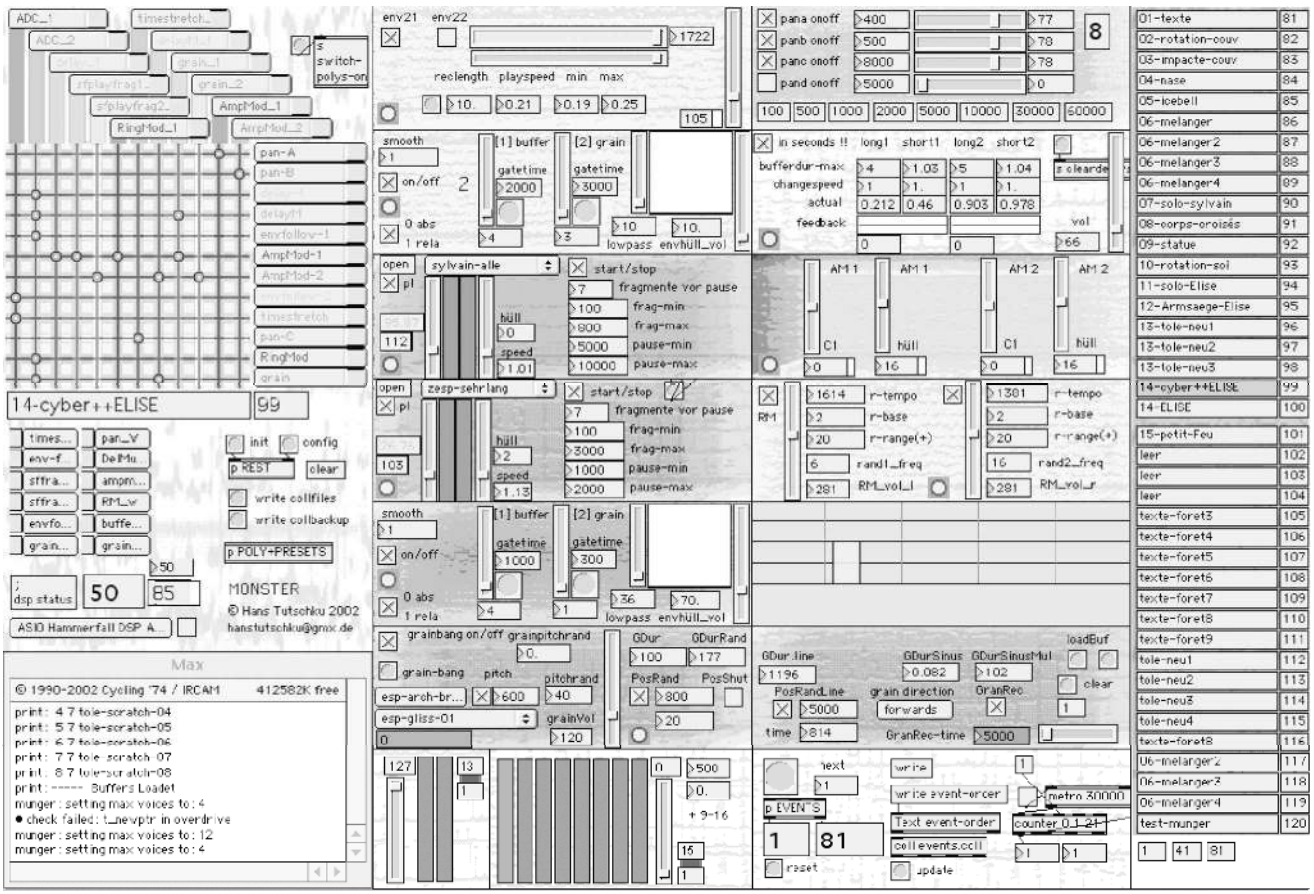
Regarding gestural control and *Das Bleierne Klavier*: because I came to electroacoustic composition through playing, I'm not a composer but rather a performer/composer. I want to "play" the studio, to have it respond to what I'm doing as if it were an instrument. *Das Bleierne Klavier* was at first research into the notion that there is not one instrumentalist who plays the traditional instrument and then another person who controls the electronics. I wanted to try to have everything handled by one single musician. The piano gestures control all of the electroacoustic part, which presents a big question of mapping parameters. What do you trace from the instrumentalist? How do you map these parameters, which are not linear but can be multidimensional, into the multidimensional control space sound treatment? This was done in a Max patch dedicated to this composition, but which already incorporated a lot of my former isolated sound treatment modules.

I came to a point saying, "Why not try to make a more general treatment environment that could be reused for many different pieces?" *Das Bleierne Klavier* was the last live electronic piece done with a dedicated patch. From then I changed into the larger environment of The Monster, which I use for all my pieces.

Nez: What aspects of the live performer are analyzed by The Monster?

Tutschku: The easiest to map is the intensity, which can be traced from any instrument, whether monodic or polyphonic. Out of intensity you can make many different assumptions of parameters to map to, such as to intensity, density, speed, dynamics, grain size of granular synthesis, or frequency of an oscillator . . . whatever you want. That's a problem of programming: there's not the complete freedom to map any parameter to any other parameter, because there are things which do not make sense. But virtually everything is possible. This research involves trying what makes

Figure 1. Screenshot of The Monster Max/MSP interface.



sense musically and discovering what are good transfer functions of a linear or nonlinear single dimension into a multidimensional space of control parameters, going through curves and functions.

Pitch is more difficult to trace, for two reasons. The first is that it is already produced by a piano. It is difficult to trace owing to limitations of the two main possibilities, using either an FFT or analyzing zero-crossings, which either tries to look for strong partials in the spectrum or count zero crossings of the waveform to make assumptions about the fundamental frequency. This works for pure harmonic sounds, but as soon as you have more than one note, then this can give a lot of trouble. I don't treat isolated pitches. I have a function that looks for spectral weight and for register. Still, you can incorporate pitch tracing, but not note by note. Also, pitch detection takes time.

Nez: What are your thoughts regarding the mix of live performers with real-time electronics and with tape?

Tutschku: This involves a new education for instrumentalists. If an instrumentalist is well-trained, can play all kinds of styles perfectly, make funny noises and sounds, and if the instrumentalist is used to playing 20th-century music, then that person may not yet be used to interaction with the computer environment. This is really an extension of what the instrumentalist is doing, which involves another kind of listening and which also involves learning about what activities on the instrument has what kind of influence on the electronics. This takes a lot of time. This is also part of our work here in Montbéliard with the Ensemble.

Nez: What are your thoughts on the possibilities of the computer's becoming more intelligent, as it

were, making more decisions of its own? For example, in *Das Bleierne Klavier*, you are at a point where no one even has to be at the computer. Do you think that you will surpass this, that you will give the computer the capability to make independent decisions as well as react to the performer?

Tutschku: I recently started working with artificial intelligence and neural networks. I'm convinced this will offer a lot of possibilities for the compositional process. The image of the computer becoming intelligent enough to make music in place of us makes me afraid! A neural network is just as good as I train it to be. The way of dealing with semi-intelligent tools is to ask yourself, as with any normal program, what is the musical use you want to make of it, and how do you integrate it into your aesthetics and into your writing? I think there are many possibilities that will lead away from the action-reaction metaphor much applied today, away from ''yes and no'' into something like ''I don't know . . . probably . . . perhaps . . .''

In the case of neural networks, I've just made a series of first tests of vowel recognition and decision-making to generate the second voice in a composition for baritone and electronics. This second voice, which could be a second singer, would instead be produced by the computer. The computer starts to improvise on these kinds of artificial intelligence network possibilities. I haven't yet had the chance to work much with neural networks to have a critical distance.

Nez: What are your plans for this piece?

Tutschku: It will probably be premiered in 2004. This is a work that will lead toward a bigger work involving music theater. I think of having several singers interact with neural networks. This will be staged with a small orchestra . . . sort of an electroacoustic or electronic music theater, which is not an opera. It uses a stage, singers, musicians, projection, and video, but it's not really like an opera. There won't even be a narrative. There's no story.

Nez: What is the role of visualization in your works? For example, in your remarks about *Migration pétrée* (2001), you state that wanted to evoke the transformation of stones into birds and vice versa.

Tutschku: I've had this idea of composing something about flying stones for quite awhile, but I felt that was not enough. Just by chance I walked through a bird market in Porto where all kinds of colored and very beautiful birds were encaged, singing, crying, making all kinds of noises, but not flying away. So this was the perfect counterpoint for my abstract image of flying stones, having all these nice birds not flying. Out of this conflict, this contrast, I tried then to treat stone sounds into flying patterns, into a single bird . . . taking abstract images from everyday life then making one sound category sound like the other one, or taking just the rhythm of one.

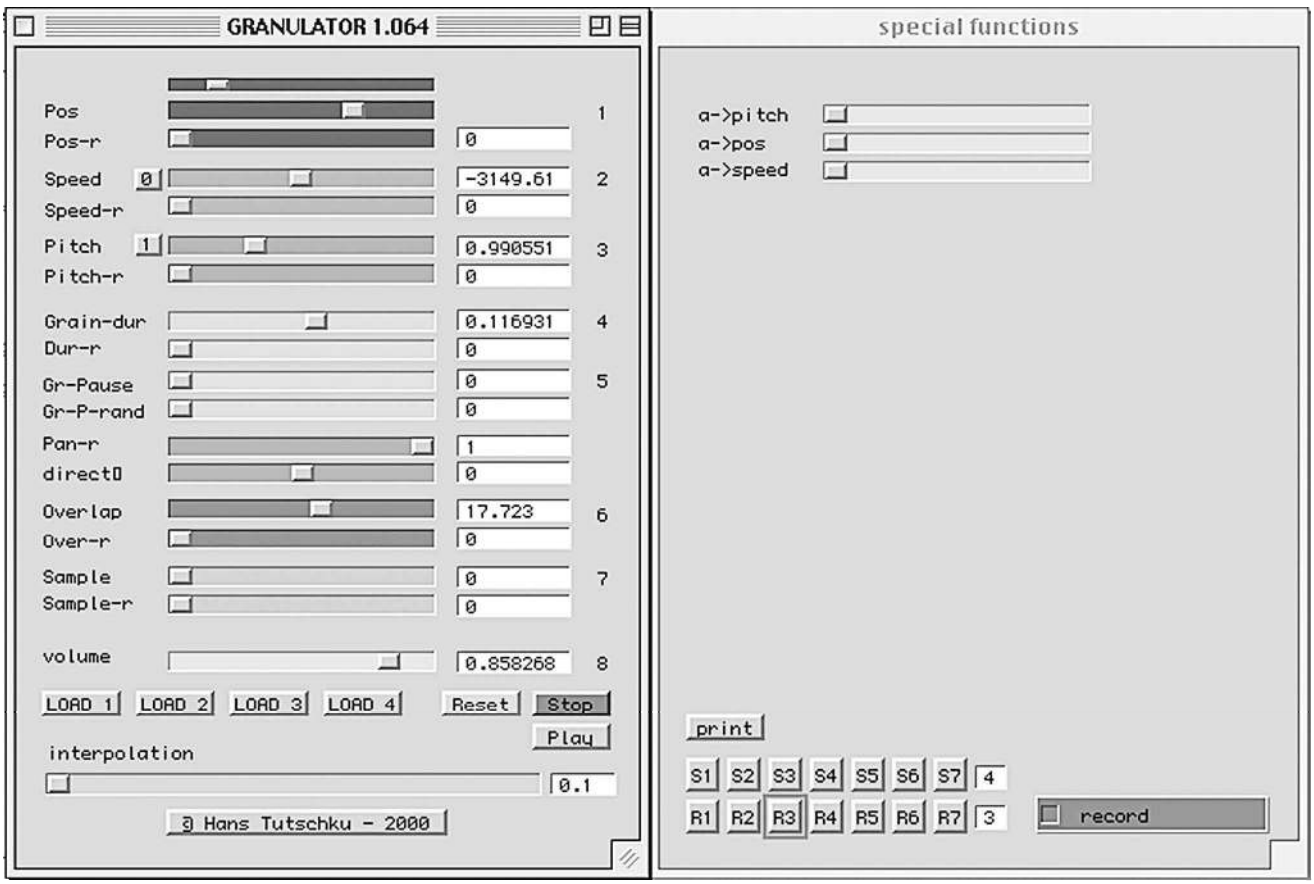
I recorded the wing sounds of some birds from very close and sculpted by imposing these amplitude envelopes onto stone sequences, making an interchange of qualities. This is something I did very early in *Die zerschlagene Stimme,* taking qualities from one sound category and putting them into another. Many composers work like this.

The idea of theater, of having very strong ideas and personalities . . . one sound is that personality, and encounters another one. Out of this meeting, a third one grows. This is very important to my musical thinking. The sense of shape is very much driven by these kinds of human or natural models of contact.

Nez: What are your processes of transforming the characteristic of one sound by that of another?

Tutschku: Dynamic sound processing is something in which I am very much interested. This means that you don't apply one fixed sound treatment to a particular sound, but during the sound, you analyze some of the morphological qualities of the sound. You apply these parameters immediately to the sound treatment that treats that sound, which means that the sound treatment is not static. Also, it's not just ''dynamic'' by having a set of parameters in the beginning and over 10 seconds going to another set of parameters; the change of sound treatment parameters is directly linked to the evolution of the sound itself.

Figure 2. Screenshot of SuperCollider granular synthesis interface used for Migration pétrée.



Let's take a very easy example, as with the piano piece *Das Bleierne Klavier*. Let's map the intensity of sound to transposition. If the sound itself is loud then it will be transposed more than if the sound is soft. Then you impose a rhythmic sequence. Every time the sequence is loud, then the result at that moment would lead to a greater transposition. If the sequence becomes soft again, then the transposition would be less.

Nez: . . . as in your granulation patch in SuperCollider, developed for *Migration pétrée.*

Tutschku: Yes, I use that very much in granular synthesis, where some of the analysis possibilities can be mapped to different kinds of parameters (see Figure 2). You can also map the intensity to the grain size or to the grain position, etc., which gives results which are much less a treatment any longer. You can't any longer detach the morphological evolution of the sound from its treatment, because its treatment now follows the morphological evolution of the sound itself.

Nez: When writing about this particular piece, you mention how the amplitude of one grain can be mapped to the following grain's pitch, to buffer position, and to grain displacement speed. Could you describe this in more detail?

Tutschku: After one grain has been played, the position of the grain can either stay the same, which would just repeat exactly the same portion of sound, or the play position can go forward or backward. If it goes a bit forward, then you slowly read through the sound. If you now map the advancement of grain position to amplitude, then it is not linear any longer. You don't read in a linear man-

ner through the sound. The speed of going through the sound depends on the actual amplitude of the grain being played. I can also similarly map amplitude to pitch as well as to random grain position.

What I do very often do is map the amplitude of the grain being played to the negative speed of grain displacement. If the sound is soft, the grains advance inside the sound. If the sound gets louder, then the advancement stops. If the sound is very loud, the read pointer is rejected and it moves backwards. This means that at every attack or at every loud portion, it jumps back. Now depending on how sensitively the amplitude is mapped to this parameter, sometimes the pointer doesn't go beyond the attack any more because it can't, because every time the play position reaches the attack it gets thrown back. This can then lead to very funny and interesting rhythmic structures that are not the result of compositional structures or algorithms. It's actually the treatment itself proposing a new rhythm.

Nez: What led you to develop your library OM-AS?

Tutschku: That started in 1994. I thought that the application of treatment should be linked to the compositional processes I apply, so through the interface of OpenMusic—at that time it was called PatchWork—I elaborated the compositional formalization of some ideas into control data for a phase vocoder. I don't use the interface of AudioSculpt, just the phase vocoder engine behind it.

This is the possibility, mainly in mixed music, of making a very strong link and applying the same compositional processes not only to instrumental writing, but also to sound treatment. Let's say you compose a melody for flute, and in the final phrase you think that this flute sound could be accompanied by a certain sound file. How do you ''compose'' the sound file? This sound file could be a counterpoint, or second voice, or whatever you want, to the flute part. By treating a sound with musical parameters that change in the same way, the second voice could take the rhythm, or the pitches, or the inversion of the pitches of the flute melody. You can then further apply this data to filtering, to cross synthesis, to transposition, to time expansion or compression.

Actually, you already have all this compositional data from your instrumental writing, and you can just use it also for sound treatment. I call that ''composition of sound treatment.'' This can present problems, however, because you can't elaborate a very nice melody for a band-pass filter if your source has no energy in that frequency range. By applying these kind of compositional algorithms to sound treatment, you have to match your source sounds. If you apply treatment to a sound, you have to think about what are the energies in the source, and match them to what you want to get. This would work perfectly with white noise, because then you always have energy in all the frequencies, but that's not interesting sound material!

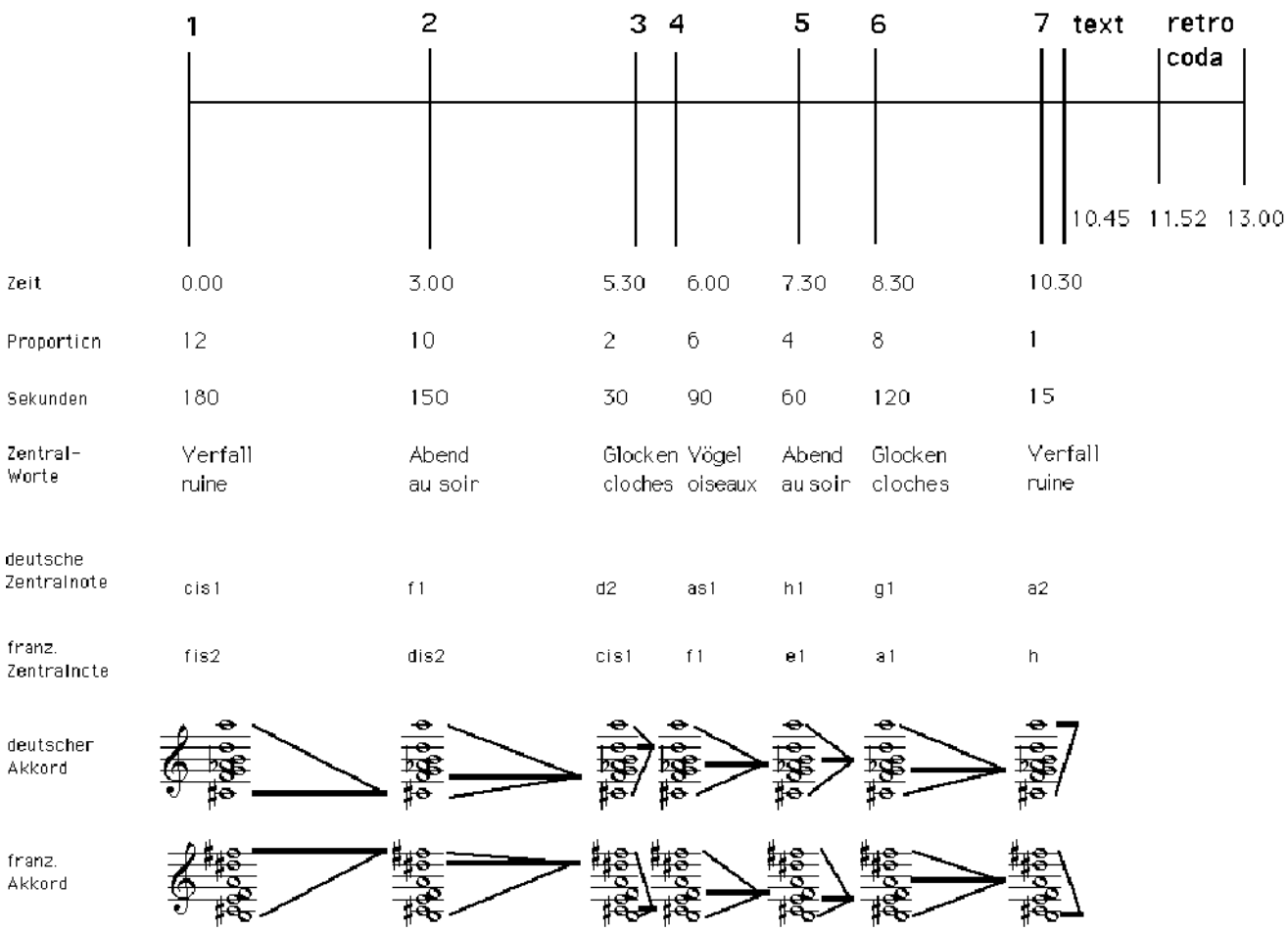
Nez: Do you use these techniques in your own electroacoustic sound treatment?

Tutschku: Yes, I did one piece that applied all of these techniques very strictly, *Sieben Stufen,* an electroacoustic piece on a poem by Georg Trakl, based on two chords of seven notes each. There is a formal organization relating the intervals and chords to durations and central notes. I did a lot of transposition of sound material using these notes.

Sieben Stufen (see Figure 3) is the piece in which I was most involved with time proportions, the length order of subsections of the composition, and the proportions of durations of sections. In that composition is a very simple series of proportions (1, 2, 4, 6, 8, 10, 12), not presented in that order. The piece starts with the longest length, the proportion 12, which is multiplied by 15 seconds to come up with three minutes. Then I progress more and more towards shorter sections, but not in a linear way. The formal scheme of all the durations and the two chords with seven notes and the central words was then recorded with soprano for all the pitches of the two chords. All this was done before working in the studio and starting to work on the composition.

Sometimes if you come up with these kinds of ideas, you have to do it. Then later you discover that there's a problem with it. The problem for me with the use of fixed time proportion schemes is that at a certain point it becomes rigid. You now know that this musical structure has to fill up 30

Figure 3. The form of Sieben Stufen.



seconds, because in your formal scheme it has to fill up this space. Then you try something and you discover that the texture itself, if you listen to it, would not fill 30 seconds! But because your scheme was set up from the beginning, you have to manage to make your material fill up the space.

Sieben Stufen was the first and only composition where I worked like this. In all the other uses of time structures, I try to elaborate probabilities, saying, "This has to be the longest section, this has to be the second longest, this has to be the shortest . . . from there I want to have a progression where every section becomes longer," without knowing exactly for how many seconds. This gives me much more freedom compared to elaborating the formal scheme from the beginning.

Nez: Why are you concerned with sectional growth in a linear manner?

Tutschku: In *Sieben Stufen* the longest section is at the beginning, a long introduction of three minutes. This gave me the possibility to make very tiny changes and to remain very static, then start little by little to go into treatments and change something. In comparison, the electroacoustic work just before my latest, *Migration pétrée,* has its longest section around the Golden Mean. This is a completely different way of dealing with material, because in the beginning I don't have a long section. This introduction to the piece is already "substructured," shall we say. The longest section happens much later in the piece, which is a very

different way of thinking of these personalities, which I spoke about already. The personalities in *Migration pétrée* get a lot of time and space toward the end of the piece.

Nez: Do you think of formal sections as distinctive enough to be theatrical personalities?

Tutschku: No, I think much more about the sound structures themselves as personalities. They get space in a certain room. I've thought for a long time about this metaphor of being in rooms. Each section is a room, and you walk into a room. I had a very nice discussion with Beatriz Ferreyra, and she commented on my composition saying there are probably other ways of going from room to room than by just opening a door and entering a room. I laughed about this and engaged her in a long conversation about what could be possible transitions. This is especially true in *Epexergasia—Neun Bilder,* the first time that the turning points from one section to another are much less marked. There can be blending and transition sections which themselves have length, durations, and proportions. You have the rooms, and the way of going from one to another becomes a second grid on top of the time proportions.

Nez: Why are you interested in glissandi?

Tutschku: Probably my interest in glissandi comes from playing the piano, where you can't make any glissando. I probably wouldn't write any glissandi if I had grown up playing violin . . . I don't know! The glissando structure is very formalized in *Sieben Stufen* where there are seven chords which glide over the duration of each section into the central note for that section. That whole composition is about glissandi.

In other compositions like *Eikasia*, you have the idea of physical modeling, and you hit a virtual plate. During the resonance the plate shrinks, something which is not possible in nature. If you hit a resonating object, usually it stays the same during the resonance. The funny thing is now it can change size and quality. A glissando can be a transition, but can also be thought of as a change of quality. It's not so much the idea of pitch glissando but a glissando in register that evolves at the same time as the changes of other parameters, such as going from a harmonic sound into an inharmonic one, going from a pitched to a noisy sound, etc.

I combine the glissandi, which are very often linear, with other parameter changes that are not linear. If you were to go from one point to another in several parameters, for example an accelerando and a crescendo which are both linear, for me this would not be as interesting as if each evolution along these two dimensions had its own pathway and the two were complementary rather than parallel. I think of the evolutions of spatial movements or spectral change, etc., as creating a counterpoint in a complex musical structure.

Nez: As much of your work involves random processes, what is their relation to your notion of compositional control, for example, guiding improvisation and planning out form?

Tutschku: I must say it's a very guided randomness. The image of "random" very often evokes this kind of *n'importe quoi*, as if everything would be possible, which is not at all the case in my music. I use randomness more in the way of "liveliness."

This is a compositional parameter: how much randomness you allow and what is the function you apply. Is it free randomness, or a randomness which goes through a Gaussian or other transfer function? Do you constrain the randomness in a certain way? I often use a random distribution applied to another random distribution, and I also often specify two boundaries which evolve over time.

Nez: Let's talk about spatialization of sound, an important aspect of your composition.

Tutschku: I've worked with multichannel setups for 14 years, and I just recently composed a new stereo electroacoustic piece, *La joie ivre.* For me, diffusion using uncorrelated loudspeaker orchestras was always a point I had to deal with, where I had to look for loudspeaker subsets which could represent my composition or the multichannel setup I had in mind.

I think of space as energy, agglomerations, gestures, or personalities. I don't have much trouble in saying, "Today, in this concert hall, my eight-

Table 2. Compositions by Hans Tutschku

Works for Live Electronics

2000	*Cito* for french horn, piano, and live electronics	
2000	*SprachSchlag* for percussion and live electronics	
2000	*Das Bleierne Klavier* for piano and live electronics	
1998	*départs* for soprano, percussion, ten instruments, and tape	
1997	*Verdichtung* for two choirs and tape	
1996	*rapprochement—éloignement* for mezzo soprano, flute, viola, and harp	
1996	*Drei Traumgesichter* for English horn and tape	
1995	*Freibrief für einen Traum* for soprano, flute, cello, percussion, and tape	
1995	*Über unsere Gräber* for flute, percussion, and tape	
1994	*Nachts* for bass clarinet, cello, percussion, and tape	
1993	*Zu Abend mein Herz* for trombone, percussion, and tape	
1992	*The Metal Voice* for percussion and tape	

Electroacoustic Music

2002	*La joie ivre*	stereo
2002	*Vibration décomposée*	4 channels
2001	*Migration pétrée*	8 channels
2000	*memory—fragmentation*	8 channels
2000	*Epexergasia—Neun Bilder*	4 channels
2000	*résorption-coupure*	4 channels
1999	*human-space-factory*	8 channels
1999	*Eikasia*	8 channels
1998	*extrémités lointaines*	8 channels
1996	*. . . erinnerung . . .*	4 channels
1996	*Les Invisibles*	8 channels
1995	*Sieben Stufen*	4 channels
1991	*Die zerschlagene Stimme*	4 channels
1990	*Sein wirkliches Herz*	stereo
1989	*Allein*	stereo
1989	*Übergänge*	stereo
1988	*Hommage à Laszlo Moholy-Nagy*	stereo
1987	*Durchdringung*	stereo

Sound Installations

2003	*Stimmen-Zeichen*	sound installation at Pragsattel Stuttgart
2001	*Der unsichtbare Hörturm*	open-air sound installation at the tower of the castle Montbéliard
2000	*KlangSpirale*	16-channel sound installation
1999	*The church as sound-sculpture in Paris*	Basle, Plovdiv, and Weimar
1998	*Klanghochspannung*	12-channel sound installation
1997	*Klanglabyrinth*	42-channel sound installation in a cave
1997	*Der unsichtbare Hörturm*	open-air sound installation at the tower of the castle Weimar
1996	*Der unsichtbare Hörturm*	open-air sound installation at the tower of the University of Jena
1996	*Klangbrücke*	4-channel sound installation
1994	*Sound-Scapes*	sound exposition in 14 pieces (Schwarzer Bär Weimar)

(continued)

Table 2. Continued

Music for Theater		
1998	music for the ballet Lissabon-Projekt	choreography Joachim Schlömer (Theatre Basle)
1995	music for the ballet Hochland oder der Nachhall der Steine	choreography Joachim Schlömer (Deutsches Nationaltheater Weimar)
1990	music for the play Sonja und Leo Tolstoi by Luise Rinser	(Deutsches Nationaltheater Weimar)
1989	music for the play Ein Stall voller Schweine by Athol Fugard	(Schicht-Theater Dresden)
Music for Film		
1991	music for the film *Brüder und Schwestern* by Pavel Schnabel	
1989	music for the film *Wind sei stark* by Jochen Kraußer	
Multimedia Compositions		
1999	*Klangwald—Lichtgestein* open-air multimedia composition, for ensemble and tape using 22 loudspeaker groups and light projection	
1996	*Flammenklang* open-air multimedia composition for ensemble, dancers, choir, tape, and 16 fire-projectors	
1996	*Imaginäre Räume* multimedia composition for ensemble, dancers, and electronic movement detectors	
1993	*Unbekannte Galaxien* multimedia composition for a planetarium	
1989	*Klang-Farbe-Bewegung* multimedia composition for dance, projection of images, and ensemble	
1988	*Vom Klang der Sterne* multimedia composition for a planetarium	
1987	*Abstrakte Diaphonie* multimedia composition projection of images and ensemble	

channel setup of the studio is not reproducible.'' Why not look for something else that would fit the emotional and compositional idea of the piece?

I found when performing my electroacoustic works at several occasions of mixed setups that combining non-homogenous sound systems with one or two setups of equal loudspeakers, arranged in a circle or any other shape, gave a good compromise as well as a ''double possibility.'' You can still diffuse your eight-channel compositions through the eight homogenous loudspeakers, reproducing something that needs the homogenous space, where, let's say, if you have a certain movement in space, you don't want to have the color changes of jumping from one speaker to another.

Nez: What are your thoughts on the dynamic diffusion of stereo over multiple loudspeakers?

Tutschku: Diffusion for me is the outlining of the compositional structure of the piece. This starts with the analysis of the piece, figuring out the form, what is the material of the piece, then an analysis of the inherent spaces of the sound structures. With the first attempt to interpret the piece on a big diffusion system, try to recreate these impressions. Amplify the space that is already inside the composition with the disposition of loudspeakers available. This is the first thing to do.

Out of that grows a sort of readability, an underlining, of the compositional structure of the piece, which becomes more readable than if heard over two speakers. And then if you manage that, the interpretation comes into play. Diffusion for me is not about movement. It is about amplifying the space which is already there.

Nez: Do you think that it is possible to teach the interpretation of sound diffusion?

Tutschku: Of course, to a certain extent. What does it mean to analyze an electroacoustic piece? This is not the analysis of a musicologist, but an analysis which serves to interpret the piece, which is different. There are possibilities to teach sound diffusion, but the key problem is that we are in front of an instrument that is hardly available. There is no conservatory with a big concert hall with such a

diffusion system installed permanently, where every week one can have five hours of practice.

Nez: How does your teaching relate to your composition and research?

Tutschku: I love teaching. Myself, I had the chance to have very different teachers who were all strong personalities, and who often explained to me that that's the only way to do such a thing. The nice thing was that, two years later, I studied with another strong artist who had complementary but different ideas. I didn't get attached to any one person's viewpoint. By comparing these possibilities to my own needs and wishes, I started to be much more critical.

When teaching, I try to be as clear as possible about the real needs for the musician. One can spend hours, days, and weeks explaining the technical details of the studio, or of a computer, or of a transformation process, etc. I always try to link these details to aesthetics, to know what could be of possible artistic application. Then I suggest to students to not stay with me longer than two years and to look for someone else who will tell them something different. But that's the richness of teaching.

If you can, take the chance to discover very different aesthetic positions and understand that they are not exclusionary, but different points of view on the structure of beauty. All kinds of artistic expression deal in general with beauty, without defining it as such, with the shaping of material. There are so many ways of shaping material.

Nez: What are your comments on composition today?

Tutschku: In general I would say that with the loss of aesthetic schools . . . of new complexity, serialism, spectralism, whatever . . . composers are a bit more forced to develop their own framework within which they want to act and function. I like very much the idea that these kinds of esthetic streams are less important nowadays. With the lack of schools today, you have to work on your personal way of expression more consciously.