

# Forum "Post-Xenakians"

**Interactive, Collaborative, Explorative, Visual, Immediate:  
Alberto de Campo, Russell Haswell, Florian Hecker**

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"A noise-ician should never rehearse." [*Toshiji Mikawa, quoted by Russell Haswell*]

Abstract: As a follow-up to a previous panel called "Post-Xenakian Applications" which was held at the International Xenakis Symposium 2011 at Goldsmiths in London, I presented three artists whose work was simply missing in my London talk. I was happy to be able to have a panel discussion with all the three of them, two of them visiting the Paris conference, one (Florian Hecker) present via Skype from Boston. Instead of a transcript of the panel discussion (which was not recorded), I give here my overview of their work as related to the conference's subject. This is an elaboration of the slide show which was presented to introduce the subject and the people and to support our discussion with music and visual examples. You can find the examples on the slides which are published alongside with this paper.

## Introduction

At the International Xenakis Conference last year 2011 in London, I gave a lecture about "Post-Xenakian Applications" [Hoffmann2011b]. I presented a selection of a dozen artists as "post-Xenakians". What does it mean to be a "post-Xenakian"? Well, it means that one must be younger than Xenakis and be inspired by his work. In our case, inspired by his work in electroacoustics, since I will present to you three electroacoustic composers. At the same time, "post-Xenakian" not only means doing art after Xenakis ("post" in time and "post" in spirit) but also doing art beyond Xenakis ("post" in a sense of transgression). Xenakis was an electroacoustic pioneer in many ways, but he did not explore too much into real time, interactivity, and collaboration, to name but a few aspects. Today's artists do.

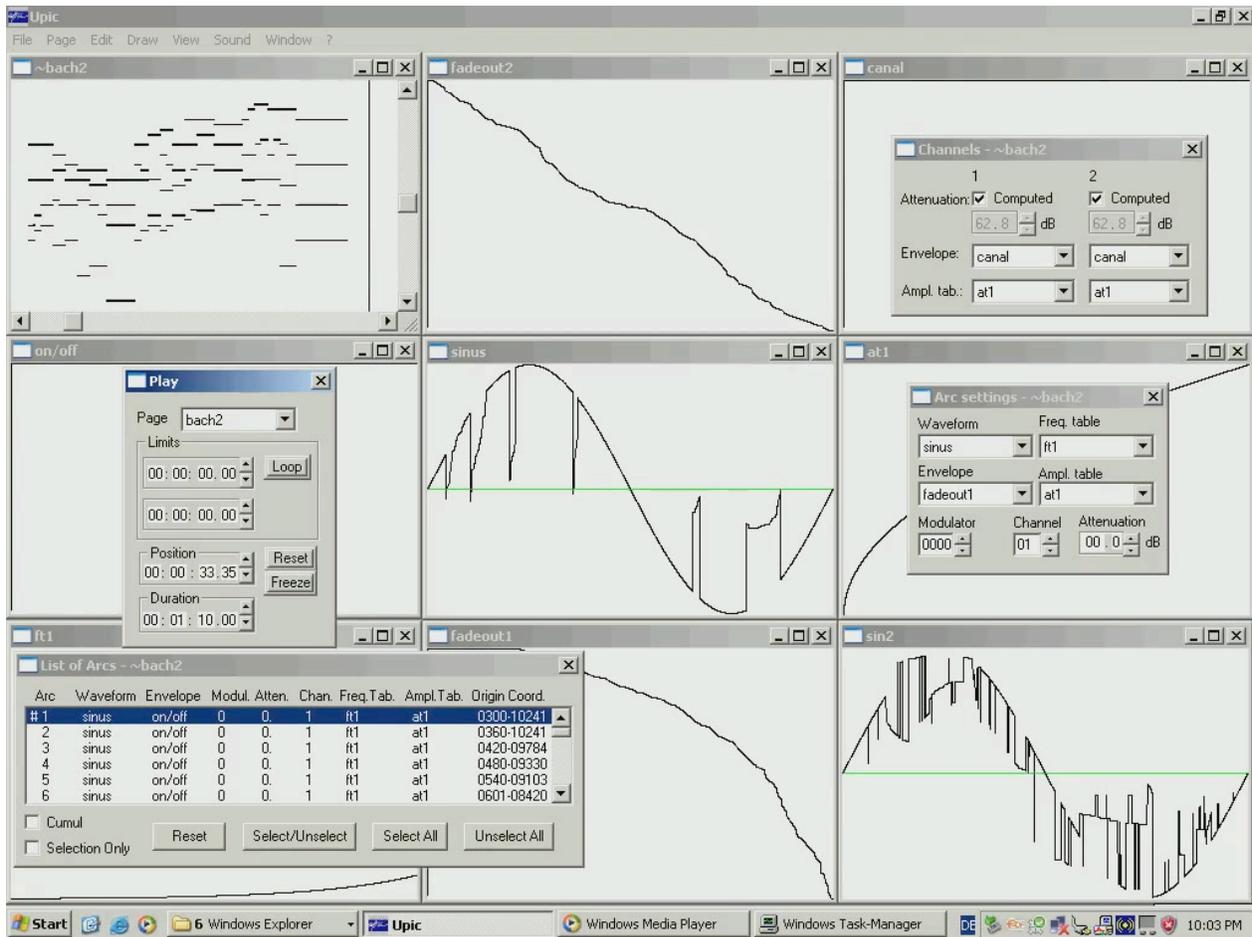
The three electroacoustic artists I presented in Paris were missing in my London talk, so this was one reason for inviting them to the Paris forum. Another reason was that two of them, Russell Haswell and Florian Hecker, worked with both UPIC and GENDYN, i.e. the two electroacoustic tools of Xenakis', which is rather exceptional (other artists who did are Brian O'Reilly and Angelo Bello). And the third electroacoustic artist, Alberto de Campo, re-programmed Xenakis' Stochastic Synthesis procedure GENDYN in order to be usable in a performance situation, as needed by Russell and Florian back in 2004. Florian and Russell still return to their UPIC material on a regular basis. They call these collaborative events "UPIC diffusion sessions", and they did more than two dozens of them since 2004 until today.

## Iannis Xenakis' Tools: UPIC and GENDYN

The two tools that Xenakis invented and that have been used by other composers are the graphical synthesizer / sequencer UPIC on the one hand and the stochastic composition tool GENDYN on the other.

## UPIC

UPIC means designing electroacoustic compositions by hand, like an architect, on a drawing board. The drawings control the sound synthesis: frequency curves, envelopes, waveforms. UPIC sounds are rather simple and static, but this is compensated by the fact that UPIC invites for designing complex combinations of these sounds. The video example is nothing else than a tutorial rendition of the Bach chorale "Jesu meine Freude", shipped with the software-only version of UPIC called UPIX, a version which was made shortly before the closure of CEMAMu in 2001. The Bach chorale must have been difficult to paint since the UPIC does not well support traditional scales and discrete pitches, as one might imagine. I like to show this example as a little provocation and, yes, I also like Bach very much.



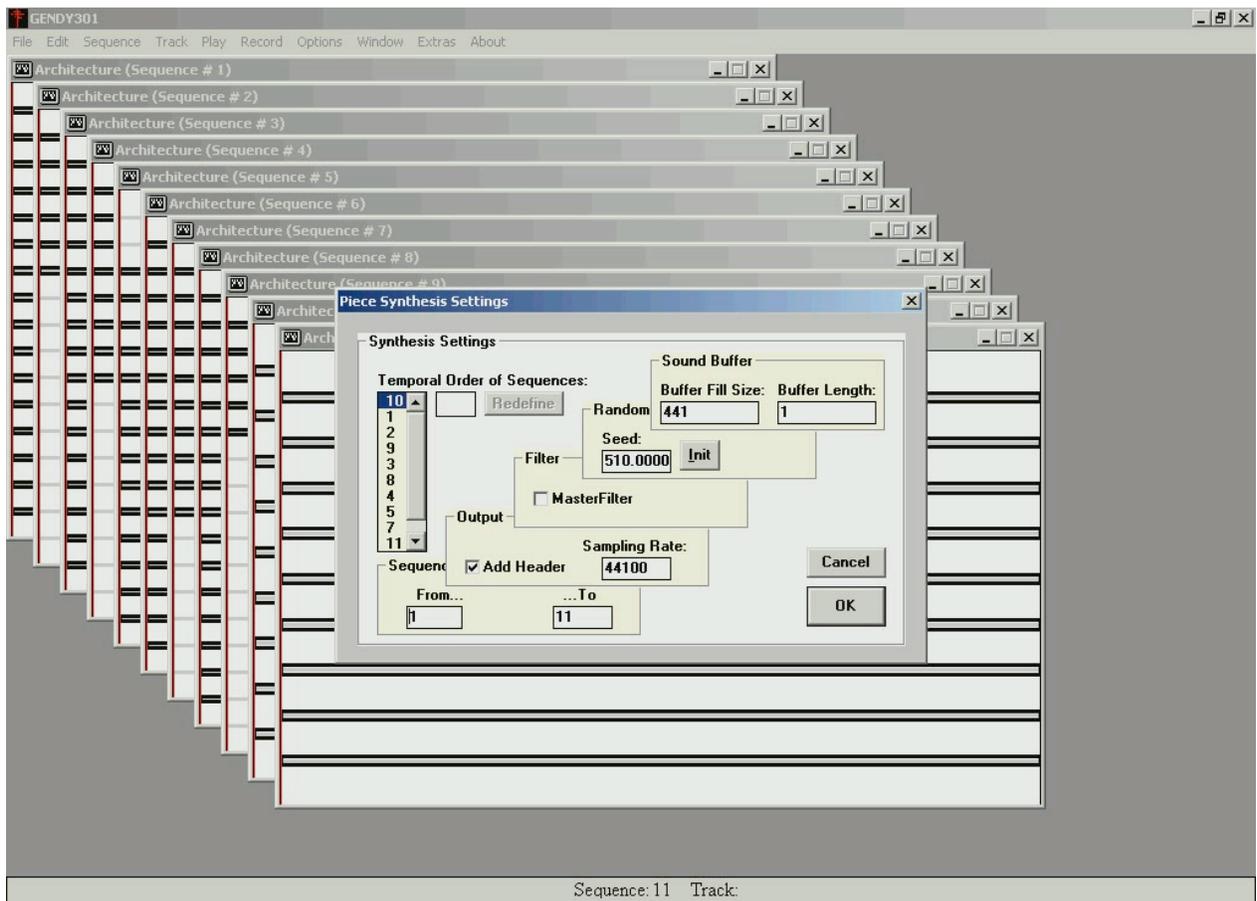
**Figure 1.** The graphical user interface of the software version of UPIC 3 called upix, in a demo version as of 2001. Loaded is the tutorial example of a Bach chorale "Jesu meine Freude", delivered with the demo version. Visible are, from top left to bottom right, the score page, showing the piano roll notation of the chorale, a fadeout envelope, stereo settings, an attack envelope with the play dialogue floating on top of it, a jagged sinusoid, a logarithmic dynamic mapping table with the parameters of a selected arc floating on top of it, an exponential frequency mapping table with the list of all score arcs of the piece floating on top of it, an alternate fadeout, and finally an alternate waveform.

The UPIC system was built from Xenakis' ideas by the engineers of the CEMAMu, his research institute near Paris (1972-2001). Hundreds of composers have used UPIC, first in CEMAMu, then as visiting composers in Les Ateliers UPIC (from 1985), later (2000)

rebaptized CCMIX, now (from 2010) CIX. In London, I presented the work of Wilfried Jentzsch (1995), Angelo Bello (1998) and Thierry Coduys (from 2004).

## GENDYN

Xenakis' invention of Stochastic Sound, his GENDYN program and GENDY3 piece (1991) are unique. Unfortunately, he made only two pieces with GENDYN (the second being S709 from 1994). However, over the years, young composers have added more research and compositions to this idea of a true computer music, that is, a music which only a computer can make. In London, I presented the work of Paul Doornbusch (1998), Jaeho Chang (1999), Alberto de Campo (2001), Andrew R. Brown (2005), Sergio Luque (2006), Luc Döbereiner (2008), Eric Bumstead (2009), and Nick Collins (2010).



**Figure 2.** The 11 sequences (sections) of GENDY3 (1991) of Iannis Xenakis, along with a playing dialogue prompting for the real-time generation of the entire piece. This is a screen shot of the New GENDYN Program made by the author. The New GENDYN Program adds to Xenakis' original algorithm of Dynamic Stochastic Synthesis a graphic user interface and real-time audio feedback.

GENDYN is sound generated out of silence by probability fluctuations, like a sonic Big Bang, without human interference. These fluctuations occur within a waveform which is repeated endlessly. Depending on the impact of the fluctuation, there are sounds between stable tones on the one hand and complete chaotic noise on the other. The video example is taken from the New GENDYN Program I made back in 1996. This program allowed me to resynthesize Xenakis' piece GENDY3 from 1991. It also made possible generating alternate versions of it or creating entirely new pieces (that was what Australian composer Paul

Doornbusch did with his *G4* piece, in 2004). In this example, I reduced Xenakis' GENDY3 to only the sounds, i.e. I removed the structure of the piece and drastically shortened it, in order to create a kind of sonic preflight, just to convey an impression of its rich sonic atmospheres.

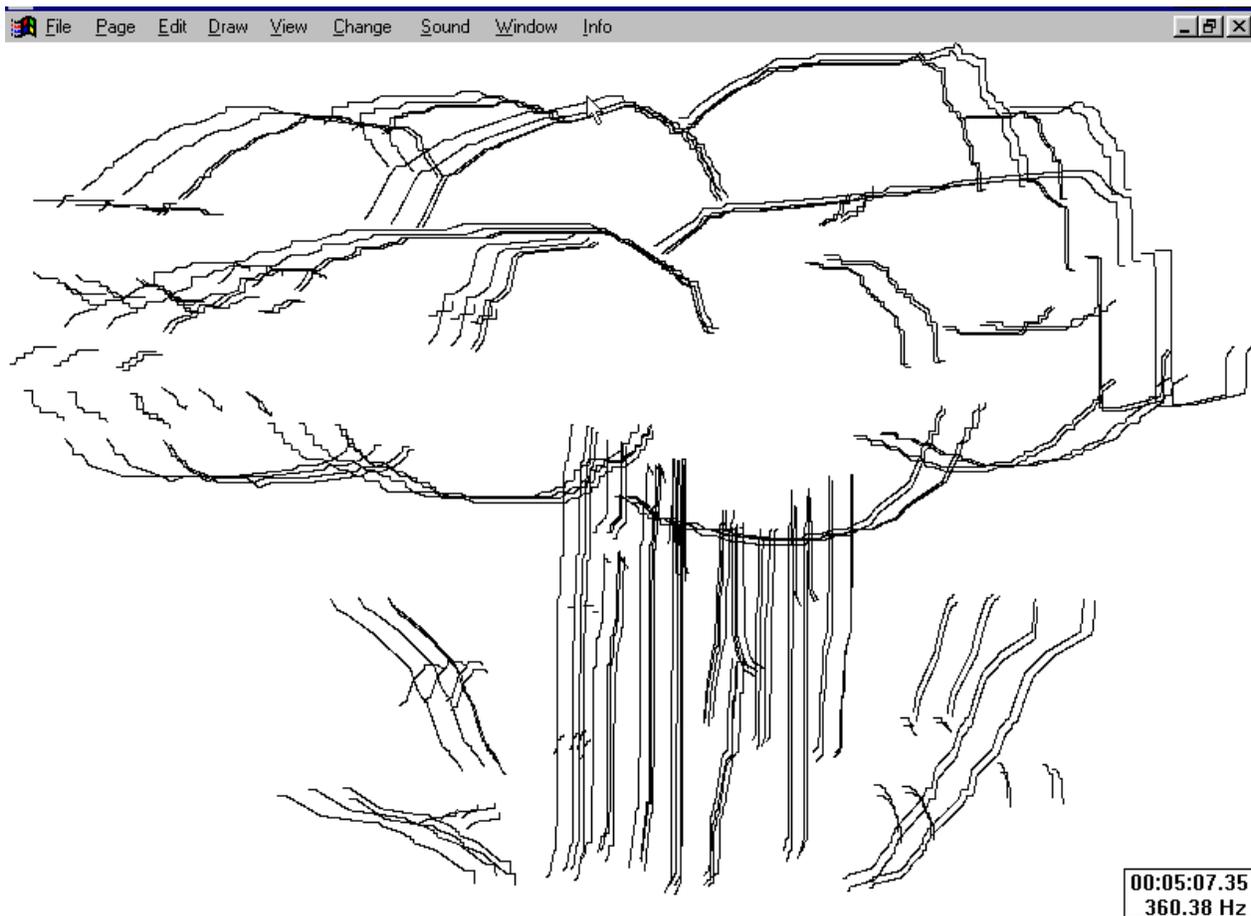
Russell Haswell and Florian Hecker are the only artists whom I know who have published music made both with UPIC and GENDYN on CD. They have spent nights and days with UPIC and GENDYN and they instantiate these sounds in visual, interactive and performative settings which are, on the one hand, as I said, two dozen "UPIC diffusion sessions", and on the other, a GENDYN live performance called "Kanal GENDYN" along with a video screening of the Swiss artists Peter Fischli and late David Weiss.

Russell Haswell and Florian Hecker met in Vienna back in 2003. One commentator on youtube called them a "dream team" of electroacoustic music, and I think he is right!

As an example of a Haswell&Hecker UPIC diffusion session, I took an excerpt from session # 17 (captured in Riga in 2008) which I found on youtube. You can find excerpts of other such events there, but I think one can only guess their intensity from the videos.

### UPIC recording sessions

Here is one of the many designs on the UPIC system that Russell and Florian did during their visit to Ateliers UPIC in 2004 (30.03-14.05.2004).

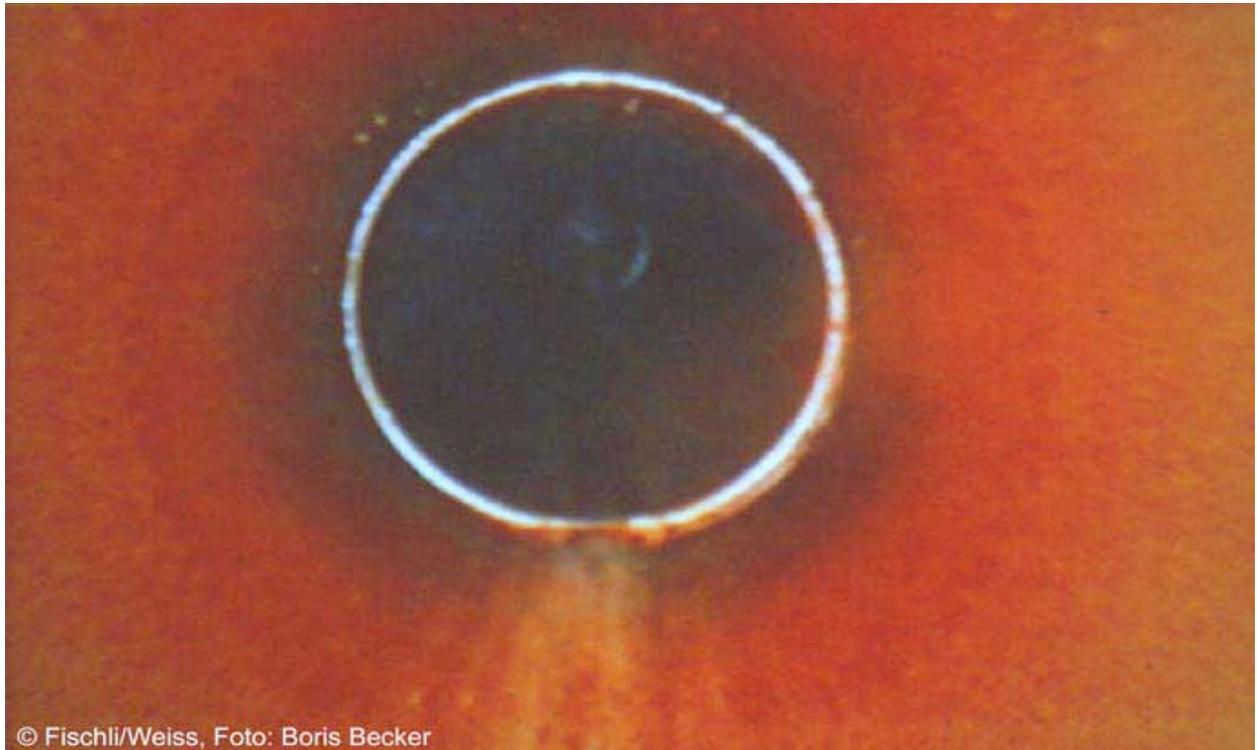


**Figure 3.** One of the UPIC pages (time vs. frequency plots) that Haswell&Hecker created in 2004 during a visit to Ateliers UPIC near Paris (© Russell Haswell & Florian Hecker, 2004, UPIC Score). The UPIC system installed in this computer music studio was version 3, with a hardware box containing a bank of 64 wavetable oscillators and a Windows software controlling these oscillators in real time via a collection of hand-drawn plots (pages, waveforms, envelopes, amplitude and frequency mappings, and a sequencer plot) and lists combining these plots to make sound. The numbers in the lower right rectangle show the position of the cursor in time resp. frequency.

There is a very informative article written by Haswell & Hecker together with Robin Mackay in his philosophical / aesthetical periodical COLLAPSE. Several of their UPIC drawings have been included in this article [Mackay2007]. The one reproduced here, for example, is a time versus frequency plot (a "page" in UPIC terms) which represents the mushroom of an atomic bomb explosion. I asked Russell and Florian if they expected to create the acoustic impact of an atomic bomb explosion and they denied. Indeed, this page does sound very different from an explosion, since it's a two-dimensional time versus frequency plot. Think of this page as a sort of piano roll but with continuous rise and fall of pitch (reminiscent of Xenakis' beloved webs of glissandi). For Russell and Florian, the atomic bomb picture was just a means to get acquainted to UPIC's way of functioning. Some composers spend a year struggling with the UPIC before they get a piece of music out of it. Some say that UPIC is a very tough pedagogical tool teaching a composer to rethink everything about composing. The fact that Russell and Florian got such good material for their UPIC sessions and their CD releases out of UPIC tells a lot about their mastering of machinery – even if it's complicated they get out of it what they want. Haswell & Hecker have also published albums with UPIC recordings, e.g. Blackest Ever Black [Haswell&Hecker2004].

### **Kanal GENDYN (1992 / 2004 / 2011)**

Kanal GENDYN was performed by Russell Haswell and Florian Hecker in 2004 at the Musterraum in Munich. The Musterraum (German for reference room) was a temporary construction, a cube which was built as a test and reference space for the planning and the construction of the adjacent museum building, the Pinakotek der Moderne. The Musterraum hosted a series of events, among them the screening of a 1-hour-long video (1992) by Swiss visual artists David Weiss (died in 2012) and Peter Fischli. Synchronous to the screening, Russell Haswell and Florian Hecker performed live and in real-time on stage with the program GENDYN choir, a special GENDYN implementation made by Austrian composer Alberto de Campo.



**Figure 4.** A still image from the *Kanal* video by Fischli and Weiss (1992), a 1-hour recording of a sewage inspection camera going through the Zurich underground. Concurrent to the screening of this video in 2004 at Musterraum, Munich, Haswell&Hecker performed live with the GENDYN Choir program made by Alberto de Campo.

As Haswell & Hecker state: *"This video, which consists of an hour long 'ride' through the Zürich sewage system, with a remotely controlled maintenance vehicle equipped with a video camera to surveil the sewers for eventual irregularities of defects - struck us both as an ideal piece to be projected in a 'nightclub' or music venue with a GENDYN only performance. We found twisted relations with such an hour long 'tunnel vision'. Once with the seemingly endless amount of computer generated video projections used as visual accompanying raves and techno parties during the 1990's - and also to the accounts of visual hallucinations induced by Mescaline as described by Heinrich Klüver in the 1920's - with the so called 'form constants' - where he mentions amongst others 'tunnel like' patterns. The particularities of GENDYN, with its ever changing and meandering waveforms appeared to us as an ideal counterpart."* [Hoffmann2011b]

Kanal GENDYN was released on both Vinyl and 24 bit DVD in 2011.

I asked Russell and Florian if they would like to do more live events with GENDYN in the future. They said yes, but Alberto's GENDYN choir program that they used in 2004 would not run any more on today's computers. We were lucky that Alberto brought his old MacBook from 2004 to the conference and gave us a live demo with his GENDYN choir program.

### **The Computer Virtuoso: A. De Campo**

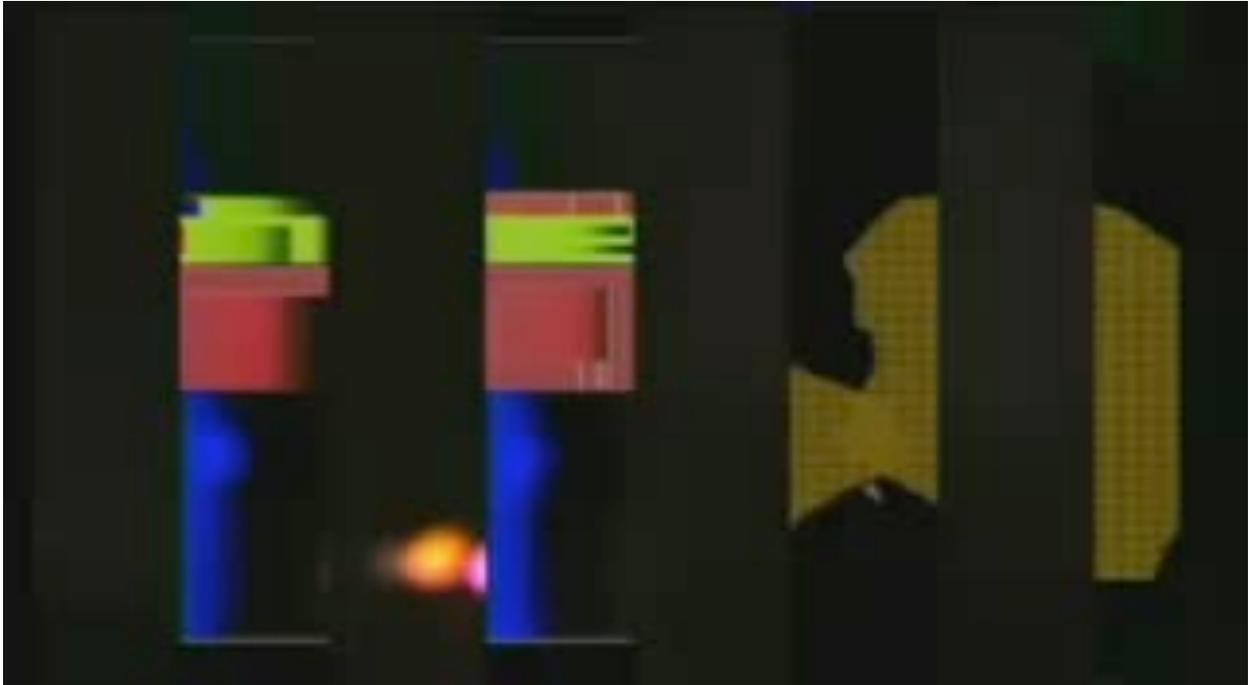
Alberto de Campo has an academic training as a composer. He has written wonderful music for instruments, for string quartet, ensemble, orchestra, and solo instruments. However, over time, he has rethought composition and he is not sure if he is to compose more string quartets, orchestral or solo pieces. Instead, Alberto ventures into improvisation, collective

sound coding events, and immersive installations. For example, together with his students at Berlin University of Arts, he invented a whole electronic biosphere installed in an underground water reservoir (*Varia Zoosystematica Profundorum – Experimental Studies in Deep Sea Communication*, 2010). This is programmatic for his approach: Alberto questions reality and virtual reality, instrumental and electroacoustic sound, and he loves ambiguities in perception, thinking and communicating. Since 1995, he is an adherent of Radical Constructivism: (“Stars, spattered out through liveness night”) where he states: “Can one really perceive reality or is reality only generated by human perception?”

What facilitates and fosters Alberto’s research into new territory of music making, is that he is a virtuoso programmer. He currently teaches Generative Art / Computational Art in the Arts and Media course at Berlin University of Arts. Alberto is also a sought-after software developer. For example, he first implemented Xenakis’ GENDYN sound synthesis algorithm in 2000 [deCampo2000], then he did another version in 2004 which supports collaborative realtime interaction, and this version GENDYNchoir is the one Russell and Florian used for their “live soundtrack” to the *Kanal* video by Fischli and Weiss.

The next stage of algorithmic composition for Alberto is that sonic decisions become more and more postponed to the live situation. So he finds himself together with a group of live composers doing live coding over a network on stage (e.g. his composers group “PowerBooks\_UnPlugged”). For this kind of events, Alberto has added libraries to SuperCollider which support executing sound generating algorithms on any other’s computer on the network on stage. I’d like to call this kind of music making, in allusion to a computer science term, “distributed music computing”. Here is what Alberto has to say about this:

*"Actually, playing sounds on everybody else's machines is an interesting, unusual spatialisation option. What I find even more important is sharing every bit of code that gets evaluated, so everyone can reuse the entire code history of the performance to create the next events. This is a form of polyphonic conversation that does not exist in any other form (as far as I know)." [DeCampo2012]*



**Figure 5.** A still image from a video footage of a live session of Powerbooks Unplugged with Alberto de Campo (Traces of Voices festival, Tilburg (NL) on Jan., 2004) [deCampo2004].

### **Algorithmic composition: Florian Hecker**

Florian Hecker is an artist of a generation which is difficult to situate in traditional terms. He calls himself a composer, but he also has a formation in plastic and visual arts. Early on he started work in generative sound, first with chaotic oscillators, then with any interesting algorithmic tool he could get hands on: pulsar synthesis, waveset synthesis, Xenakis' UPIC and GENDYN... It is remarkable that he prefers microsound tools, that is, tools that do not rely on any preconceived or „natural“ model of sound excitation but define the sound signal at the digital sample level by deliberate artistic means. So Florian is a sound sculptor with tools that he fabricates himself or in close collaboration with others, e.g. Alberto de Campo. This is also a sign of a new spirit in contemporary sonic arts: the lone inventor Iannis Xenakis is replaced by networks of artists who exchange code and ideas.



**Figure 6.** Florian Hecker's sound installation „Event, Stream, Object“, commissioned by Museum Moderne Kunst, Frankfurt/Main in 2010, as part of a programme called „Radical Conceptual“.

Florian has a very conceptual approach to digital sound. Like Xenakis, he likes pure concepts, and that is why music made with Xenakis' tools is not post-processed nor embellished with other means. He is aware of the medium he works in and makes it the subject of his art. He has created a series of conceptual albums, as it were, where sound and music demonstrate ideas on sound, on media, on art. Many of his releases are also on vinyl LP as, among others, *Blackest Ever Black* [Haswell&Hecker2007] and *Kanal GENDYN* [Haswell&Hecker2011].

### **The multidisciplinary artist: Russell Haswell**

For me, Russell Haswell is the Jimi Hendrix in Electroacoustics. He likes the immediate grip on his hardware sound modules which he controls and repatches during performance. He has a strong background in electronics and sound engineering, and is interested in noise music, not only his own but also the noise of others, e.g. the Japanese noise scene. But in a post-Xenakian perspective, what is noise music other than music? For Xenakis, noise was the richest sound and he always strived towards it, be it the finale of *Gmeorgh* for organ, the ending of *Bohor* or the noise passage in *GENDY3*.

Russell wanted to get hands on use of UPIC and GENDYN from the first time he heard of it. These tools fitted well into his concept of "Extreme Computer Music" (or "Explicit computer music", as I would call it), that means, music that takes the computer seriously and not as a fake instrument or a music production assembly line.

Russell is not only a musician but also presented "conceptual and wall based visual works, video art, public sculpture, as well as audio presentations in both art gallery and concert hall contexts" (Wikipedia on Russell Haswell, accessed on 03.10.2012)

He states: "As a child, in the seventies, I spotted oscilloscopes in the background during scifi film and television programs. But it wasn't until the late eighties that I first had the pleasure to attend both vinyl and compact disc mastering sessions. It was during these sessions that I first witnessed the use of a Stereo-Phase Scope or XY Oscilloscope. The Stereo-Phase Scope is a visual aid for the mastering engineer; it displays both the phase, DC offset and the stereo width of a two channel audio signal. The constantly shifting images displayed on the scope are also referred to as lissajous patterns. It's like an oscilloscope (which displays the side elevation of a wave-shape) but imagine, looking at two wave-shapes front-on! [...] Part of my ongoing research is to find different ways to create and control, in real-time, new and interesting shapes and images with only two channels of audio plus Stereo-Phase Scope visualisation. During 2011, I released the CD *ACID nO!se Synthesis* (Editions Mego), that documents some of my experiments in this field. (Russell Haswell, February 7, 2012 *Composing with process: Perspectives on generative and systems music #6.2*, 2012, *Ràdio Web MACBA: Museu d'art contemporani de Barcelona* (<http://rwm.macba.cat>))

The example I took is Russell Haswell's first performance using his new modular analog synthesis system took place at the Snap event at Snape Maltings on Nov 6, 2011 [Haswell2011] (see Figure 7).



**Figure 7.** Russell Haswell tweaking his modular analogue synthesizer at the SNAP art exhibition of Aldeburgh Festival, England, on 06.11.2011. Coupled to the sounds, in the background, an XY-oscilloscope displaying mesmerizing patterns as the sounds evolve [Haswell2011].

## Conclusion

I hope that there will be more post-Xenakian forums in the years to come because there are more post-Xenakians than I know of and their number increases every year, and as I hope, partly due to the forum at the 2012 Paris conference. See you at the next post-Xenakian forum!

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