artery

the journal of the ICMA

2009 - 2010

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Jen Wang, designer

The International Computer Music Association

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Letter from the President

by Tae Hong Park

July 9, 2010
Dear ICMA Members,

It is a great honor to be able to serve as President of the International Computer Music Association. My first encounter with the ICMA was at the 1998 ICMC in Michigan. It was without a doubt a memorable and "ear" opening experience on so many levels, ultimately leading me to regularly attend the annual conferences, organize the "Katrina" ICMC in 2006, and recently serve as the ICMA's Vice President for Conferences from 2008 to 2009 under the leadership of Mara Helmuth. As ICMA's recent President, Mara Helmuth contributed greatly to the continuing development of the ICMA. I am certain that I speak for everyone on the board when I say it was wonderful working with her during those two years. And although she will very much be missed at the board meetings, I am sure we will see her regularly at future ICMCs.

It is with confidence that I can tell you the ICMA board members are working very hard to improve the organization by serving not only its membership but also the computer/electronic/electro-acoustic music community at large. At the 2010 board meeting in New York, we decided to make the conference papers freely accessible from the ICMA website. The process leading to the consensus to offer free access to the conference papers was not trivial. In the end, however, the agreement seemed to point towards the important idea that ICMA should actively engage in the promotion of computer music, which includes facilitating access to research results not only by ICMA members but also by anyone interested in our field.

We are currently engaged in a number of activities to promote computer music, including exploiting social networking paradigms such as the ICMA Facebook page, providing ICMC conference organizers with more significant interest-free loans than previously available, and much more. We are also very actively researching the feasibility of creating an archive for computer music works that are presented at the conferences, as well as helping to create a professional and functional ICMC media submission system that can be used by future conference hosts. In short, there is much exciting activity currently at the ICMA, and we hope that you will stay tuned and offer us feedback so that we can better serve you.

As Mara Helmuth wrote in the Array newsletter in 2008, we are always interested in hearing from potential ICMC conference hosts. If you would like information, have any questions regarding what hosting an ICMC entails, or are considering organizing an ICMC conference please contact the VP for Conferences Meg Schedel and me (the most up-to-date email addresses can be found on the ICMA website).

If you have any other questions, suggestions, comments, or concerns regarding the ICMA or the ICMC, please do not hesitate to contact me or the appropriate ICMA directors or officers. We hope to see y'all at the 2011 ICMC in Huddersfield!

Sincerely,

Tae Hong Park

Associate Professor, Composition Program
Head, Music Science and Technology Programs
Tulane University Music Department

Letter from the Editor

Since our last issue, *Array* has undergone some changes. The first relates to the editorship: as of January 2010, Margaret Schedel has taken on the position of Vice President for Conferences on the ICMA board and will no longer be a co-editor of *Array*. We thank Meg for her years of service to *Array*, and also for her leadership with ICMC 2010.

The second change has to do with the format of *Array*. In the past few years, we have released issues electronically as PDF files. While that will still occur, Array has created a blog to enable a more frequent release of content with an opportunity for member feedback. Please point your browsers and RSS readers to http://arrayblog.wordpress.com.

If you would be willing to write something for *Array*, have feedback about this issue or ideas for future issues or blog posts, please send email to array@computermusic.org. Those interested in writing a review should also include a mailing address and any particular areas of interest, so that I can send you any appropriate materials. CD/DVD and book reviewers will be able to keep review copies free of charge. If you have materials you would like reviewed, please send to:

Dr. Jennifer Merkowitz
Music Department
One Otterbein College
Westerville, OH 43081
USA

Please consider contributing; the success of *Array* depends on input from its readers. I look forward to hearing from you!

Thank you,
Jennifer Bernard Merkowitz

Letters to the Editors

The letters below were received from *Array* readers about the 2007-08 double issue. The final letter is from ICMA's former webmaster, Toine Heuvelmans, about the possible implementation of some of the ideas introduced in "The Future of the Concert Review" (pp. 75-76).

February 21, 2009
Dear Array editors,

Here is my answer to your question (ref: "The Future of the Concert Review") "Do you read the reviews in *Array* as they currently stand?": Yes, I enjoyed the *Array* 2007/2008 issue's concert reviews! Please keep publishing the reviews also in the future. Debate, riots and keen journalism, even, are most welcome. Maybe you could also include some works on the website... but perhaps that would be easier (because of copyright and performance rights, legal and money issues) if you can appropriately protect the mp3 recordings' access to ICMA members only.**

Best regards,
Kari Vakeva

**PS: Note that many composers (at least those in Europe, like me) have delegated their compositions' public performance, radio and netsite play rights ownership to organizations, so general public access to the stored recordings may need to bring the organizations that own the rights into the process? (It's possible, but may be costly and bureaucratic.)

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March 20, 2009
Dear Array editors,

I just wanted to say that I really enjoyed this latest issue of *Array*. It was nice to reminisce via those concert reviews of the past few years, and Max's short story was an unexpected treat.

I thought the discussion of review purpose and integrity was very important. It does seem like because the ICMA is such a small community that not wanting to upset our peers and/or challenge friendships is a big part of the epidemic of niceness. I

think your idea of having a "live review" area on the Web site is excellent, and might be able to break down some of that anxiety. It could be invaluable to get multiple listens to a piece and promote a dialogue between composers, performers, and audience in (hopefully) a way that feels more like constructive feedback than the sense of one-sided judgment that can be perceived in a published review. Seems like it shouldn't be too arduous to get a couple of people willing to share their pieces online and submit to a test run of praise and/or pummeling and see where it goes from there. :-)

--John Young

* * * * *

August 8, 2009
To the Editors of Array:

I was of course pleased that Nathan Wolek and *Array* took enough interest in my 2007 CD *Electric Brew* to include a review in the 2007-08 issue. In an era of media overload and intense competition for our attention, it isn't always easy to gain people's ear. I believe that Nathan's review, however, raises more questions about musical criticism than it does about my creative work. I write in response with some hesitance, as my general feeling is to keep the roles of composers and critics separate. However, in this case, both of us are colleagues and, in fact, writers as well as creative people, and the present setting is a collegial journal. It seemed to me, particularly with the encouragement of the editors of *Array*, to take a chance and write. I do so in a spirit of collegiality and friendship with a goal of engaging ideas rather than personalities.

There are many forms of critical writing. The types that I find most useful are those that engage the ideas, sounds and processes that organically emerge from the work of a composer. Less useful, to my mind, are those where the concerns and judgments of the critic take center stage, replacing concerns of interest to the composer. This is especially the case where colleagues discuss the work of other colleagues. My hope in those circumstances is that the reader will emerge with fresh insight about a work already experienced, or a curiosity that moves the reader to explore the work for her or himself. While Nathan offers a complimentary note about my piano playing, I question whether his sharp criticism of *Electric Brew* was all that constructive. My point, and the reason for my writing, is that his criticism seemed to me to rest on issues that are far more about his own concerns than they are about my work. Surely, the balance between these is not an easy one. The problem here is that I find out far more here about Nathan as a listener than I do about any of the musical concerns that drive my CD.

There is much to be said about the long history of musical works that quote or comment upon existing works. This appears to be Nathan's central interest in his discussion of *Electric Brew*, presumably because some of the pieces draw thematic elements from Miles Davis's landmark recording *Bitches Brew* (1970). Nathan's position is that the standard by which my work should be judged is Miles's original recording. This comparison imposes a framework that seems rather literal minded and questionably useful. Nathan holds: "In my opinion, you cannot write music that is inspired by another artist, draw motifs from his work and then absolve yourself from comparisons… I have no ideological qualms with him using these materials; sampling musical materials is par for the course in our post-modern world, and I will concede that Gluck has done something unique and original with them." This surprises me, since the two recordings inhabit dramatically different aesthetic universes, despite some shared thematic phrases. Nathan continues: "However, Gluck's compositions do not rise to the level of those works by his muses." Granted the iconic status of Miles Davis (and in point of fact, I do not sample any sound clips from Miles), this is not exactly an insult. However, the primary attention given to this issue results in Nathan misunderstanding what my 2007 CD was about and thus does a disservice to the potential listener.

My starting place for the composition *Electric Brew* was a series of interactive Max/MSP patches for the *shofar*, none of which were designed to emulate Miles's playing. Instead, they allowed me to explore how a computer could take hold of my playing what was already a relatively unstable instrument and gradually spin the results out of control. Certainly the texture of Miles's multi-layered, intense "brew" was of interest to me, in particular the balance act between organization and chaos. I wondered how a single performer might create a musical fabric that reflected that kind of balance in live performance. After a few months of performances, I decided to place this work within the context of a few Miles-inspired pieces that I was developing. I thought of them as fantasias that build up swirling masses of digitally processed *shofar* sounds, within which the piano interweaves allusions to elements of *Bitches Brew*. These abstractions are further abstracted in the collage-like interludes.

I have found that audiences that recognize the historical allusions have "aha" moments, yet those for whom they are not familiar simply appreciate the music totally on its own terms. Nathan is the first I have heard to focus entirely on those references and present them as the fulcrum upon which a referendum on my music

should rest. To offer one example found in the review, Nathan correctly notes that Miles's recording and its large percussion-intensive ensemble work was tied to a strong sense of beat. However, what I do points in a rather different direction, despite the historical allusions. I'm glad that my work brought Nathan's attention to those originals, reminding him of how he loves the beat structure, but my work in question is simply not centered on a beat. It lives in a very different aesthetic universe. Of the five pieces that reference the work of Miles, it is conceivable that one, *Pharoah's Spring*, might be viewed in closer relationship to the original. Here, I overlay themes from *Pharoah's Dance*, once again on top of swirling abstractions (in this case, algorithmically generated phrases of electronic sounds). Surely, the electronic drum sound that appears cannot compete with the substantial rhythm section led by master drummer Jack De Johnette, but this is in no way my intent.

Nathan proceeds to dismiss my five-movement *In the Bushes* because I utilize sound samples of speeches by George W. Bush. In fact, this usage takes place in only a single movement. Nathan presents a generalized concern that since the piece is topical, being about the Iraq War, it is thus ephemeral and this ends the discussion. In fact, the final movement of *In the Bushes*, as the program notes point out, utilizes musical processes for their metaphorical value, and the movement discussed by Nathan interweaves Bush's voice with speeches from militarists of the past. These ideas were selected specifically to help the piece transcend the historical moment, but Nathan skips over this dynamic, which pervades the entire piece. The final movement also integrates two layers of piano playing, one performed directly by the pianist and a second performed by the computer via the Disklavier. The same process comes into play during my performance of a Disklavier piece by Shlomo Dubnow. Nathan criticizes the recording for not separating these two layers. However, the integration of the two into a single whole played by a single instrument was precisely the point.

Nathan opens his review by noting that one can learn about this CD by referring to my personal history. However, he gets some of it quite wrong. That the Dubnow and Ben Amots pieces and *In the Bushes* appear on this recording is testimony to the fact that my musical training was as a concert pianist in a conservatory setting and not as a jazz pianist. The latter designation is the one by which Nathan marks the theme of this CD. *Electric Brew* in fact documents a series of performances that marked my transition towards my integration of jazz and avant-garde concert music. But I do not think that one will find here an integration that replaces electroacoustic music aesthetics with idiomatic jazz

elements, as this review seems to suggest. One also learns little of substance about my use of *shofar* on this recording beyond the anecdotal factoid that I attended rabbinical college and thus was familiar with the instrument.

I welcome constructive criticism, yet question how constructive this review is in understanding my music on its own terms. I worry that when colleagues read sharply dismissive pieces of writing crafted by another colleague, critical thinking about the work will end rather than be furthered. Who would chose to listen to something that has been so dramatically dismissed? My preference is always for people to listen and judge for themselves, doing so with open ears, hopefully not constrained by presuppositions that make it impossible to hear that which a composer seeks to convey. My hope is that musical criticism will shed light on musical issues that arise and, when raising questions, open them for exploration and consideration. I fear that here any such questioning is shut down rather than opened up. In the end, I'm not sure how the reader is served.

--Bob Gluck

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In response to Jennifer Merkowitz's article "The Future of the Concert Review," I made an attempt to write down what we actually hope to improve. As the title of her writing suggests, it's the *concert* review. The main issues with this kind of review are the problem of enabling repeated hearings and the lack of honest and intelligent debate. I believe that reviews of festivals and seminars encounter these same problems, and thus I wish to include these in this small revolution. To extend this, I also wish to include the CD or DVD review; although it does not suffer from any temporal problems like one-off events, it is reviewed in the same manner, thus qualifying for the second issue.

If you look at what can be reviewed at an ICMC, apart from the conference in general, there are tape pieces or "sound tracks"; live performances with musicians and/or laptoppers; video pieces, sometimes combined with live performance; and last but not least, installations. The above-described issues all apply up to a certain degree. However, installations often present a third issue when it comes to reviewing or discussion, which is *interactivity*.

As Merkowitz mentioned, a reviewer of an event or performance "jots down notes […] and types them up a week (or a month, or six months) later." This delayed review is an issue that, considering the solutions I have in mind for the other issues, is worth keeping in mind. A somewhat similar issue is the *social experience*. An opinion is best formulated when it's

fresh, and discussion (i.e. talking about the social experience) can best be done when the audience's opinions are fresh.

To summarize the issues, we have:
1) Enabling repeated hearings
2) Honest and intelligent debate
3) Interactivity
4) Delayed reviewing
5) Social experience

And now to tackle them. Concerning the first, I'm not going to debate the purpose of reviewing a one-off event; as designer of the ICMA website and former ICMA webmaster, I'd approach this from a more technical standpoint. I'd focus on the problem of readers of a concert review having no idea what the actual concert was like. I believe we should not try to use the Internet to provide repeated hearings. However, we should use it to give an impression of the concert, just as images in an article don't tell the entire story, but accompany it. Via the Internet, we can provide photographs, audio and video (with copyright taken into consideration)—whatever is best suited to give an idea of what the reviewer is talking about. As long as we don't wish to provide the reader with exactly the same experience (f.i. 8-channel pieces) but only an impression (f.i. a stereo excerpt) of what the reviewer is writing about, then I see almost (see issue no. 3) no technical complications.

The second issue, honest and intelligent debate, makes me think about the movie *Ratatouille*. There's the critic, who is respected for his honest opinion about what's served in restaurants. This expressed opinion can be negative; if he says a restaurant is bad, then apparently it is. When a critic is only "back patting," I believe this damages his credibility, and his review helps no one. An honest critic is someone with whom people can identify, which is impossible if he likes everything. However, he remains an individual, and everyone should be able to express his or her opinion. Not everyone is as eloquent as the acclaimed critic, and not everyone wishes to express their opinion while having their name published with it. Luckily, the Internet is an ideal way for these people to express their opinion. Anonymity can easily be realized on fora, and for people who just want to "rate" something, there are numerous possibilities, of which I think a *folksonomy* is very interesting. A folksonomy enables people to anonymously *tag* certain online content, either by selecting one or more tags from a list, or by adding their own words (ingenious, brilliant, longwinded and the like). When these words are given a certain value, content can be sorted on popularity. A nice example can be found at http://www.ted.com/.

Interactivity is best experienced and understood when you actually participate.

I believe that for installations or performances in which interactivity with the audience plays an important role, it is up to the reviewer(s) to provide the right combination of words and supportive online media to create an impression of the experience of this interactivity (NOT to mimic the interactivity using some interactive web content).

At conferences like ICMC, you'll see quite a number of attendees carrying around laptops or smart-phones, and a great number of them are able to connect to the Internet. If you provided them with a means to quickly comment or rate a performance online, you could avoid delayed reviewing, and the opinions would be fresh. You could choose to let these people surf to http://www.computermusic.org, navigate to the appropriate performance, and fill in a form or hit a button. However, there are ways to speed this up. Think for instance about what you can do with widgets (like Mac OS X dashboard's), which can be directly connected to a website. An ICMC widget could list all recent performances, and when clicking on these, you would be able to instantly shout an opinion, or add to a folksonomy. Similar instant reviewing can be achieved with software ("Apps") for smart-phones such as the iPhone.

These types of opinions are often shared within small groups during or after a concert, but they are seldom discussed within a larger group. Thus the importance of the social experience gets overlooked. I think it would be great if there were an organized forum at the conference, as soon after the performance as possible.

Let's focus on the online reviewing and discussion. As opposed to printed reviews, often with a limited amount of words, a website is flexible enough to incorporate all sorts of background information, in this case full program notes, composer bios, media files and perhaps interviews. The role of the reviewer changes into a discussion moderator; however, he will additionally write either a summary of this discussion or a personal review to retain a printable report. Additionally, there could be a tag cloud as a product of the folksonomy for each event, roughly illustrating the average opinion of the audience. Composers should—if possible—be involved (or better, active) in the discussion.

If the piece warrants, it would be possible to have two discussion categories: one about the experience of the music, and one about the technology/notation/"realizational apparatus" of the music. While proposing multiple discussions per event, one can think of discussions for each performance (gathered under the event, which might have a general discussion), since experiences in

both of the above categories can vary per performance in a single event. A standard concert review also discusses each performance separately.

A final technical point is notification when there's an update to the discussion. The moderator would be automatically notified, but anyone else could sign up to receive a notification (not the actual update itself) through email. To be more up-to-date, though, I believe that RSS feeds are ideal for this purpose.

Having shared my ideas on the technical part of "The Future of the Concert Review", we are now left with issues like the purpose of reviewing a one-off event, avoidance of mutual back patting, and live fora on social experience. I believe this can best be discussed at the next ICMC.

--Toine Heuvelmans

ICMC 2008 Keynote Address

by Trevor Wishart
given at Queen's University, Belfast, Northern Ireland
August 27, 2008

First of all, I'd like to say how honoured I feel to be asked to give this keynote address to the ICMC in Belfast, especially looking at and listening to much of the innovative work on display here. At 62 I'm beginning to feel like one of those aging rock stars, with the droopy eyes, advancing weight problem and receding hairline, rolled out on TV chat shows to talk about the good old days. But we all get old eventually, so I hope you'll bear with me.

I want to begin by saying that I intend to be controversial, because I want some of the issues I'll raise to be discussed and argued about. I may exaggerate a little for the sake of encouraging debate! I'm going to talk about my experience over 40 years of working with music technology, and I want to focus on 5 important questions. These are:

1) The Access question: who can use this new technology?
2) The Repertoire question (a question for performers or promoters): how easily and how widely can this music be performed?
3) The Visibility question: who listens to this music?
4) The Stability question: are these technologies sufficiently stable to be widely adopted and explored in depth by the musical community?
5) The Aesthetic question (probably the most contentious): how can we evaluate the work we're producing?

To start at the beginning of my own journey into this new world, we have to return to the 1960s. At that time computers were almost mythical entities, vast purring beasts kept in sealed, air-conditioned rooms at a constant temperature and exclusively attached to University Science Departments or huge business enterprises. They were attended by their grateful 'minions', who had to type computer code onto punched cards or paper tape and feed these into reading devices that would not have looked out of place in a mass-production factory.

Live-performance devices for electronic music consisted of things like analogue filters, distortion boxes for electric guitars, or delay-lines based on looping-tapes. Some were packaged in a black box "effects unit" to do a pre-ordained task like flanging or phasing. The format of these devices was determined by the demands of the commercial music industry. Widely available electronic synthesis was primitive,

but was adopted into commercial keyboard 'synths' as an extension of the traditional organ.

Electro-acoustic music had to be made on analogue tape-recorders, which ran at 2 or 3 speeds, and possibly had vari-speed control. Sound could be fed from several of these to a mixing desk, where some kind of EQ control and panning was possible. The major tool was the razor blade, with which you would cut the tape in a splicing block, and the fight against analogue noise (or signal distortion) when making or mixing recordings was perpetual. So the available apparatus for sound-manipulation was minimal, and you had to rely very much on your own ingenuity and lots of time-consuming and tedious work, as well as on your sonic imagination.

What made it worth grappling with these uninviting tools were the new aesthetic possibilities they offered. In particular, for me, it was the ability to bring any sound, no matter how complex, from the real world into the musical domain and to have some means to musically manipulate it. However, the limitations of these tools quickly became frustrating. You can understand Boulez's impatience with sonic-art at the time, as one had almost no handles on the inner-workings of sounds. The commercial approach was to use signal processing as a way to massage or colour pre-existing musical structures.

This equipment was also relatively expensive, especially the mixing desk and associated plumbing. So production was confined to University studios or special National Centres (like EMS in Stockholm, Radio Warsaw, or the GRM). As a student or invited guest you might have access to a wonderful studio, but if you didn't end up as a university music lecturer or a rock star, a personal studio of any useful power was beyond your wildest dreams.

In the late 60s, *musique concrète* and experimentalism swam in a context of high modernism. Tones had to be atonal, rhythms arhythmic, counterpoint or texture dense and hyper-complex, and forms enigmatic or non-redundantly impenetrable (the theoretical notion of maximising "information" through non-repetition).

The audience was miniscule—a tiny element of the already tiny audience for contemporary music in general—and confined to specialist venues where the necessary hardware for performance could be assembled. However, there was a radio audience in North America, which had a culture of many small public-subscription radio stations, and crossovers with the more experimental end of popular music had begun to happen.

At the time, my focus was on innovation

and new possibilities, with little concern for issues of repertoire or the stability of the resources. I only became aware that there might be problems of that sort after working for some years on quadraphonic spatialisation of sound (which inspired the chapter on "Space" in *On Sonic Art*). Suddenly, manufacturers decided that the commercial market for 4-channel analogue tape machines was not viable, and they ceased to produce them. A few years later, I found myself in a small German city, scouring the local rock-studios for a now-redundant 4-channel tape-machine that was rumoured to still exist, in order to play one of my pieces in that evening's concert. For the first time, the problem of the long-term viability of this music hit home to me.

For the sonic arts community, more worrying was the long-term viability of the medium itself. Scored music could be easily copied (by hand if necessary), but tapes had a finite lifetime even in the most advanced storage facilities. In one's enthusiasm for the work, one tended to put these issues to the back of one's mind.

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The arrival of computers heralded a revolution in the way we could think about sound. As I've argued in *On Sonic Art*, traditional ways of thinking about musical structure—on a lattice of pitch-classes and duration values—tended to regard the other properties of sounds, lumped together in the catch-all category 'timbre', as a kind of colouring in of the structural framework already provided by pitch and duration.

The idea of rational signal processing—applying a rigorous analytical and synthetic approach to all aspects of sounds—means that traditional formal approaches to music-making can be extended to the sound as a whole. More radically, I've argued that the key conceptual shift is from thinking of music as the organisation of the *properties* of sounds to thinking of music as the organisation of sounds as unified objects that we can transform in a multi-dimensional space. With hindsight, Stockhausen's *Gesang der Jünglinge* can be seen as a prophetic piece in this regard, although it was still framed in the lattice-oriented conceptual framework of serialism.

The ability to analyse sound in detail and to understand and control its inner structure were the high-end pay-offs. More banal but equally important were the conquest of unwanted noise, and the replacement of cupboards full of tape-reels by physically invisible computer-files and the whole data-management environment that came along as a free perk with the computer. Most significantly, here was a way of precisely and permanently recording sonic

data in a format independent of particular physical-device specifications, and storing it permanently.

However, for technical reasons related to computer speed and job-sharing protocols, this kind of processor-intensive computer-music was initially confined to a handful of institutions around the world, of which IRCAM was the only one in Europe.

For me, the aesthetic pay-offs were immediate. In *Red Bird*, I'd been struggling with the idea of using sound-metamorphosis as an approach to organising musical materials. In the analogue studio, one could do this only in a limited way. However, with some background in maths and science it was clear to me that it should be possible to take sounds apart and reconstruct them using computers. I immediately submitted a project to IRCAM, which got me invited onto their induction course. Here I discovered that my intuition about sound-morphing on computers was in fact correct, and I was invited to make a piece. However, my entry into this world was delayed, as IRCAM then decided to change its computers and reconstruct its software base. I had to wait another 5 years before I could begin developing sound-morphing tools using the Phase Vocoder. This down time proved to be constructive for me, as I ended up writing *On Sonic Art*, the book about all the things I would have liked to be able to do, if only I had the tools to do them! And this inability to continue the work illustrated one major problem of such research-intensive, centralised institutions.

The high visibility of IRCAM on the European music scene certainly raised the profile of music-with-technology among the general classical-music public. But the centralisation of technical resources, if anything, made the access and visibility questions more acute. The research benefits of these large institutions could only be offered to a very few composers and for very short periods of time. This meant that the institutions could be resented, and the music they promoted dismissed as irrelevant, by the larger musical community that continued to pursue avenues not reliant on the technology in this magic castle in the sky. And the division of the musical world into the 'elect' and the rest meant that there were composers at IRCAM who not only had no idea what to do with the technology, but actually feared it. They were only there because their publishers felt that an IRCAM piece would look good on their résumé. Using the technology was to be a mark of status, not of commitment.

Moreover, the research emphasis created problems even for the composers lucky enough to have access to these resources. If they were able to make a return visit, they were more than likely to find that the technical environment of the institution

had significantly changed. So two-thirds of their time would be taken up in learning the new tools available, and too little was spent in composing the work.

The repertoire issue is best illustrated by the legendary problems of putting on Boulez's *Reponse* with the million-pound 4X machine. What venue could afford to import this machine and the technical back up crew required for the work to be performed?

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At the other end of the spectrum, live-electronic devices powered by computer chips in black-box signal-processing modules began to be developed for the commercial music market by major manufacturers like Yamaha and Roland. However, the computing power in these devices was pre-packaged and sealed in. The devices were generally inflexible, with settings only changeable through a complicated sequence of button-pushing operations, and the preset states available were completely controlled by what the manufacturer considered to be desirable or marketable. (The advent of the DX7, with its programmable FM-synthesis patches, did improve this situation to some extent.)

In between these extremes, imaginative, programmable devices like the 8-bit Fairlight machine or the Synklavier made some degree of detailed musical intervention possible. However, these were still in the University-studio or rock-star price-bracket, so they could never become the basis of a more widespread musical practice.

In general, composers wishing to work with affordable commercial devices and willing to work within their limitations could easily transport their music from venue to venue. However, the priorities of manufacturers and musicians were not the same. For manufacturers, the priority was to sell as many units as possible, so each year the black boxes appeared in new updated versions or were superseded. Works or musical practices dependent on the original devices quickly had to be reformulated or simply abandoned. The repertoire problem began to be significant. For composers, the problem was the stability of the composing environment. Why spend the time developing expertise in writing works using these pieces of equipment if there was no guarantee that they would be available a few years down the line?

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The second really important revolution in computer music had almost nothing to do with musicians or music-technologists. It was the arrival of the desktop computer, with its gradual increase in speed. During

the 5-year hiatus in which I'd waited for IRCAM to replace its computers and update its software base, I'd acquired a desktop computer (an Atari—Macs were not fast enough for professional audio-quality sound at the time). With a group of computer-music enthusiasts in York (in particular Martin Atkins, Andrew Bentley, Archer Endrich, David Malham and Richard Orton), we developed a small interfacing box and ported public-domain programs like Cmusic, and later the Phase Vocoder, onto these desktop machines. Most significantly, we began to establish a viable environment for building new software-instruments at home. As a result, I was able to continue developing new sound-morphing tools, like waveset-distortion[1], or iterative-extension[2], together with more and more sophisticated means to manage and organise musical data, and these all became part of the Composers' Desktop Project suite of tools, which graduated onto the PC.

Most importantly, we were now able to make music on an environment that was affordable, relatively permanent, and under one's own control.

Quite soon thereafter, IRCAM itself moved to a new regime based around desktop machines, allowing composers to take its innovative tools away from the main institution and work with them at home.

Today desktop computers and laptops are almost universal (at least in the developed world) and have much greater power and speed than even the biggest of the computing machines that were installed at IRCAM when I first went there. High quality digital recording is easy and cheap, and there's access to an inexhaustible stream of source-sounds via the media and the web. There's also powerful free software available on the Internet; at the click of a mouse, you can produce an endless stream of continually novel sound events. With hindsight, we can see that the Composers' Desktop Project cooperative was a key pioneer in this field, liberating public domain software in use in the big institutions and going on to develop

1. Waveset distortion is a whole class of signal-processing algorithms that do many things, from semi-unpredictable distortion of natural signals to 'organic' envelope generation. The musical example, from my piece *Imago*, demonstrates waveset duplication modifying stable attack-resonance sounds derived from the clinking of whisky glasses. These sources are themselves taken from Jonty Harrison's *...et ainsi de suite...*

2. Iterative extension is a way to plausibly extend natural iteratives, like vocal grit or rolled 'r' sounds, that have similar, but non-identical, short, attacked components. In the example, from *Globalalia*, the first sound in each line is the recorded source, and the sounds that follow are plausible time-extensions and extended musical developments of these. The sources are recordings of Japanese TV actors playing samurai warriors.

hundreds of new signal processing tools, making them available cheaply to a new constituency of non-institutional producers of Sonic Art.

Today production is completely decentralised. Anyone can make electro-acoustic music on a home desktop computer, or generate flexible live-electronic patches in MSP, Pd or Super Collider.

The positive impact on IRCAM and other institutions has been immense. Many more composers could pass through their gates, and those composers were better prepared and the quality and depth of the work they produced increased greatly. Furthermore, the wider musical community began to feel empowered. Sonic Arts were now a normal activity to which all musicians could realistically aspire.

This new ease of access to sound materials and tools has also ushered in the vast growth of Electronica and experimental DJing out of the world of popular music. Artists like Square Pusher, Aphex Twin and Richard Devine help blur the boundaries between art-music and popular entertainment, re-establishing a link lost towards the end of the 19th century. Before that time, the piano in the living room was a place where the "classics" could be played alongside the latest music hall songs (and there were still easy-to-play classics). The desktop computer as a sound recorder and manipulator has re-established the link between popular and art-music applications of this technology, as well as amateur involvement in 'sonic play'.

There are also many new fields of artistic activity using sound. We could mention Soundscape Art, where the focus is on the authenticity of what is recorded; Installation Art, where sound can be an adjunct to a visual exhibit or an exhibit in itself, and where the listener experiences sound in his/her own time-sequence in a gallery space, rather than following a clear start-to-end time-line defined by a composer or performer; and Radio Art, where we may be especially concerned with how sound is transmitted and received. We're also seeing a new kind of "Algorithm Art", where an algorithm is set in motion, but because of uncertainty about the initial conditions, unpredictable inputs or system instability, the sound or graphic output cannot be predicted. So the resulting sound or visuals become a kind of evidence that the algorithm is doing its stuff. They are epiphenomena or by-products of the process rather than its goal. This is certainly an interesting area to explore, though for me it's not music, except by chance. Imagine a program that generated strings of integral signs, numbers, plusses and minuses, and so on. The output might be fascinating to look at, but it wouldn't be mathematics, except by chance.

Furthermore, because of the ease of assembling sound materials and the simplicity of processing, one can knock together a sound piece of some kind in a short time, and it's now commonplace to give the drummer a break and put together a quick electro-acoustic atmospheric track amongst an album of otherwise 3-minute songs. This is what I'd like to call 'Light Electro-Acoustic Music' without denigrating it in any way, the modern equivalent of those wind-band pieces written to be played in the park in Old Vienna when one wasn't writing the next Symphony.

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The problems of visibility and accessibility appear to have been solved. But these are ongoing problems as the technology develops. Speaking here close to the SARC centre with its impressive sound-diffusion hall, one's focus is obviously drawn to the current developments in sound-spatialisation technology. I recently attended an amazing event at TU Berlin, which featured the GRM's Acousmonium, the ZKM's Klangdom and the TU 2000+ loudspeaker Wave-Front Synthesis array in the same hall, and heard many spectacular works composed for (or projected on) these different sound-spatialisation systems. The musical and aesthetic possibilities they each offer are very exciting, but they reintroduce the problems of access, visibility and repertoire into the world of music-technology. Any hardware intensive system creates problems in transporting musical output to other (or rather, most) venues. For the composer, owning such a system in its current manifestation is inconceivable. Even if you are an invited guest at one of these institutions, the time available to work, and therefore develop skills, on such a system is inevitably limited. At the moment, for the average non-institutional composer, the idea of *scaling up* a finished work from stereo or five-point-one to multi-stereo or multi-channel by diffusion on an Acousmonium or SARC-type system is still a more practicable possibility than competing for limited access-time at a major institution to work on a highly sophisticated spatialisation system, and then having few opportunities to present the work in its finished form elsewhere.

It seems to me that a parallel revolution in the design of very cheap, high-quality loudspeakers is necessary if such systems are to really take off in the specialist musical community, let alone in the wider arena of music venues. We need to make this technology accessible. Speculating wildly, from a composer's point of view, my thoughts were drawn to those curious globe-shaped hair dryers one used to see in women's hairdressers, fitting right around the head. Might it be possible to

develop a structure like this, fitted with dozens of tiny high-quality loudspeakers which could all be physically repositioned, and software reconfigured, to generate a miniature SARC or ZKM around one's head? It would be something that would give a good (if low audio quality) approximation of the effects of a multi-loudspeaker environment in a hall, and allow one's ideas to be more quickly scaled-up and realised when faced with the real thing—the 'SARC space-helmet' perhaps! This may be completely crazy, and yet even this would not solve the problem of the portability of the finished work to venues beyond the major institutions. That really requires high-quality loudspeakers (and the accompanying cabling, or radio-transmission) to fall nearer to the price-bracket of decorative wall-tiles.

Different cautionary remarks could be made about some of the exciting new commercial devices that have become available, like the Wii controller. Are we sure these devices will still be around in 10 years time?

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And has the stability question been solved? Although in principle digital media offer a more controllable and a more stable environment for sound arts, the problems have not entirely disappeared. In some senses, the priorities of technological research and the artistic requirements are at odds. The continued improvements in sound storage media have seen me transfer works from analogue tape to the PCM digital-on-videotape system to digital audiotape and most recently onto audio and data CDs, DVD-RAM and Flash Memory. Recent rumours have suggested that CDs may now be on their way out. So I guess in the end digital media will rely, like everything else, on institutional archivists willing to devote their time to preserving (and inevitably selecting for preservation) digital materials, as the technology marches forward.

In the home studio, the stability of one's working environment can be continually threatened by software 'improvements' or operating-system upgrades, and, if you use commercial software, one puts out of one's mind thoughts of the long-term viability of the product or the commercial companies that supply it. In the very long-term, perhaps, only open-source code and open-source operating systems will provide a guarantee of stable composing environments.

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The repertoire issue continues to be problematic. In the classical musical world, successful works get performed by many different groups, and therefore develop a history of interpretation and reception by

audiences. They enter the repertoire. This relies upon the fact that most musicians use the same technology (the traditional acoustic instruments) and have all the skills necessary to use them. In this way the music matures and takes on a life of its own.

Working with computer technology with very large ensembles (like orchestras) requires an extra layer of experts alongside the technological hardware, and in most situations, this is currently neither affordable nor available on a concert-to-concert basis. As a result, most scored live-electronic pieces are written for small ensembles who have some commitment to these kind of works, and they're performed within institutions where either the composer or technical experts can offer the technical backup required. Taking these works 'on the road' can be problematic, as the composer cannot always be on hand and most venues cannot guarantee the sort of technical backup required. As recently as 2006, a well-known international ensemble that champions new music performed their no-technology version of Berio's *Aronné* at the University of York in the UK. York is an ideal place to get equipment and technical expertise, yet they chose not to ask for it. Their reason? Jettisoning the technology made touring much more practicable.

Packaging more complex set-ups in something as portable and generally available as a laptop would seem to offer a simple solution to the touring problem. But even the best patches can screw up, computers crash, and so on. This can be disillusioning, even for the committed non-specialist. Performers in the past who have worked consistently with music-technology, like Jos Zwaanenburg or Jonathan Impett, have tended to gather together a particular set of easy-to-operate and easily transportable black-boxes or patches that they can manipulate on stage without major technical help. The only performing group I ever worked with who had a technical person on board all the time was Electric Phoenix, and John Whiting was an audio-engineer rather than a computer-operator.

In this context, the possibilities for live-electronic works to pass into the repertoire are still not good. Writing uncrashable patches helps, plus using totally robust and easy-to-operate hardware that doesn't change radically every few years (if only it existed). The only real long-term solution would seem to be including a computer-music expert in the performing group, but unless the group is intending to perform computer-using works all the time, this is unlikely. What might solve the problem is the development of a viable profession of computer-musicians who could be hired for particular tours or concert seasons, so that performing works using technology

would not seem daunting to the average musically-adventurous chamber group.

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Finally, I've mentioned the many new developments in the audio arts, and welcomed what I would call the *normalisation* of the sonic arts in the wider community. The sophisticated large-scale structuring of sound I'm interested in takes its place in a continuum of possibilities from musical 'Kunst' through popular culture to pure amateur messing about with sound.

What's more problematical is the spread of a certain strain of post-modern social criticism that blames 'modernism' (and often, by implication, the Enlightenment) for the horrors of Auschwitz and the Gulag. Often starting out with the best of intentions, like criticising the dominance of European cultural values or, from a feminist perspective, the dominance of male-oriented cultural perspectives, it can sometimes end up making any kind of aesthetic (as opposed to sociological or political) valuation impossible. In this situation, the utilitarianism of 'The Market' takes over, where shopping becomes the ultimate expression of human freedom. How can there be any place for musicology or aesthetics if artistic value is merely market value? More importantly for me, how can we possibly justify spending large amounts of time crafting sound materials or developing new software instruments if all we really need to do is stick to available clichés and improve our marketing skills?

This is not just a theoretical issue. Departments of Music embracing Technology increasingly have to justify themselves in either 1) market-oriented terms: their turnout of record-producers, Foley sound experts for the film-industry and so on, making a visible contribution to the economy; or 2) technological terms: music (and particularly music using technology) has to be cast in a Science/Technology mould, with research projects having technological (and therefore marketable) outputs. At the very least, research projects must be portrayed as if they are tackling technological or practical problems, and hence potentially generating industrially useful output. In this atmosphere, musical outputs can tend to be downplayed, at least in the official reports. (I'm glad to say that the music at this conference demonstrates that we are successfully fighting off these pressures, so far.)

But if we were really to follow the market-oriented theory of value, we would be forced to some absurd conclusions. For example, in December 1997, "Teletubbies say Eh! Oh!" was top of the singles charts in the UK for some weeks. As most of you probably won't recall, the Teletubbies were one of an ongoing sequence of

puppets or mannequins invented for the televisual entertainment of very small children. "Eh!" and "Oh!" were a pretty good sample of their conversational sophistication. In the Christmas period of 1997, the BBC released a single 'sung by' these mannequins to capitalise on the Christmas consumer surge, and the music was pitched at the same level as the lyrics. As intended, many doting parents of tiny tots bought the record for their offspring. By the logic of exchange value, this was the most valuable music available in the UK over this period.

But the market ranking doesn't take any account of the sophistication of the audience (are they aged 2 or 42 for example); the influence of topical but transient events (the popularity of what's on the telly, the Christmas shopping spree); socio-economic trends (the pressures for both parents to go out to work due to the dictates of the consumer economy, almost obliged to keep their kids entertained in front of the TV); the originality, craft, or even the duration of the merchandise.

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So how, in this atmosphere, can we categorise 'Art-music' and at the same time escape the stigma of being 'elitist'?

I think we need to differentiate between *elitism* and *exclusivity*. For me, electro-acoustic and live-electronic music have already breached the exclusivity barrier. The tools for making them are reasonably accessible through powerful free or cheap software, ease of high quality digital recording or easy access to media or web sound streams—compare this to writing for an orchestra. The means of distribution are easily accessible through independent CD publishing and web distribution—compare this with the historical problems of getting musical scores type-set, printed and distributed, and obtaining the backing of a major publishing house to promote performances of the work. And the work is easily 'visible' to potential listeners through CDs, or the web, not confined to some specialist venue in a distant metropolis. Furthermore, in my own musical practice I run workshops for both professionals and non-specialists, school-children, the elderly and so on, helping to develop people's own creative abilities.

But accessibility must mean *elitism for all*, not just anything goes.

And if we're going to defend 'high' art values we have to ensure, at least in the medium term, that the technological facilities we are developing for such artistic endeavours are not the exclusive prerogative of insiders, people who work in the institutions or their Ph.D. students. We have to ensure that eventually some version of these resources enters the public

domain, as with IRCAM and the desktop revolution. At the very least we have to worry about what all those gifted research students are going to do once they leave. Institutional posts are a finite resource, and most of them will have no chance to acquire one. Hence my call for the development of cheap loudspeakers, and the means to interface these with a laptop, to match the exciting high-end research that's now going on.

The two elements of 'high art' I want to stand up for are, firstly, detailed craft coupled with the ability to build large-scale formal structures; and secondly, an engagement with ideas, and as a consequence, hopefully, the durability of the work. My skills or intellectual emphases may be different from others, so I'm not foregrounding my own particular skills or intellectual concerns in opposition to the skills and ideas of others. I want to stand up for all those who value craft and ideas in the Arts.

For example, soundscape art involves great skill in both selecting and recording its material. It also carries an implicit critique of some dominant ideas in our culture, particular the notion that we are masters of nature and have the right to exploit it and mould it in any way we want. I agree with this critique and its seriousness, even if my musical practice is very different. I don't think what I do contradicts a soundscape perspective, and I choose to express my environmental concerns by other means, e.g. by not owning a car.

In my own work, my concerns are more with the way industrial/consumer culture impinges on human values and how we might maintain a humanistic perspective despite the market—a concern for what we do and how we treat each other rather than what we own. My stress on the importance of craft and form-building, and making a durable product, springs from this idea. Also, coming from a family of manual workers, I admire the way carpenters, plumbers or plasterers work skilfully with physical materials, whereas hedge-fund managers are no more interesting to me than betting-shop owners. I'm also very aware of the tradition of free-thinking labourers in the area where I was brought up. And I started my University career as a scientist, so I'm very much in favour of the Enlightenment.

This often feels like swimming against the tide for various reasons. The market stresses built-in obsolescence, making things that look good but have a limited shelf life. Turnover is paramount, transience essential. The market also tends to privilege horizontal diversity over vertical complexity. It makes it easy to move one's focus sideways, from Polynesian folk-music to Burmese hip-hop—whatever takes your fancy in the everything-is-

available superstore of world culture, rather than pursuing some particular area in increasing depth.

Also, speaking as someone who still performs as a vocal free-improviser, I often come across the view that spontaneity or 'improvisation' *of any kind* is somehow morally superior to spending lots of time slaving over the details. It seems to encapsulate the notion that we're all free, unconstrained individuals, not hemmed in by any rules or obligations. This was perhaps best encapsulated in the punk-era philosophy that democratic access to music-making was more important than actual musical competence. But, in our society, the 'outlaw' is a standard folk anti-hero. There's nothing remotely anti-establishment about being anti-establishment; trashing the hotel room for the 100th time gets a bit predictable.

Good improvisation, from Bach to Coltrane to laptop orchestras, is founded on hard work and experience. Furthermore, good electro-acoustic or live-electronic composition can be viewed partly as a kind of slowed-down improvisational process, as new sounds and new software instruments throw up unexpected possibilities that we must *play around* with before we can find their most effective musical use.

From another perspective, easy access to an over-abundance of sound materials from the media and the web and free, powerful software tools can make the idea of slow, painstaking studio work even more unglamorous. This was brought home to me by a student I was mentoring who was amazed to find that I composed 'down at the millisecond level'. All the sounds in his work were selected from online sound-libraries and simply edited together in Pro-Tools. After enjoying my work in the concert he said—without irony—how great it would be to sample it.

I'm obviously not against sampling, as the piece *Two Women* demonstrates. And one of the highlights of the festival for me was Brian Cullen's *Thrice Removed*[3], with its sophisticated integration of video imagery and sound spatialisation tied to a strong idea. You didn't need to read the programme notes here to understand that this was an exploration of how 'reality' is construed or constructed through the media.

It also raised an interesting side-issue about the use of topical material in Art-works. What happens when the topical reference ceases to be topical? I've already had to face this question with *Two Women*: I've played it to school kids who don't

3. This piece uses excerpts from the long-running popular British TV soap *Coronation Street* as the starting point for exploring notions of reality in the media.

know who Princess Diana is, never mind recognise her voice. So you have to be sure that both the musical structure and the commentary being made will survive the demise of the specific subject matter you're using. I think the Cullen piece passes this test, and I'm hopeful that this will also be true of *Two Women*.

I also admire highly crafted and intensively-worked plunderphonic pieces. But there are no deterrents to being less painstaking. The ease of sampling other people's material has meant some professional entertainers—who I can't name in public—have been able to turn theft into an art form, leaving the hard bits to others. It's flattering to have one's work widely quoted, but the perpetrators are unlikely to give you any credit for your effort. And, in this context, it's only the formal coherence of a work that will set it apart from an elegant collage of chunks of it together with other people's materials, picked-and-mixed by one of these fly-by-night superstars.

Finally, at my age, I can even admit that *tradition* can be useful. At the very least it provides a handy checklist to test whether our 'spontaneity' is merely a cliché, our 'originality' just a self-delusion. It's also a treasure house of good ideas that can be re-interpreted or further developed rather than attempting to reinvent the wheel on every occasion. We don't need to pretend to be *entirely* original to be fully human. The unique individual is merely a marketing construct.

What interests me at the moment is how to build large-scale musical forms within the sonic medium. My last released work, the three-movement *Fabulous Paris*, was subtitled 'a virtual oratorio' to link it to the tradition of extended non-staged works for voices, but this is a purely secular oratorio. The piece takes as its starting point our experience of living in vast cities in a mass society. For example, the third movement uses layered recordings from the media (traffic-accident announcements on the California freeways; advertisements; game-show hosts; political commentary or demagoguery) to suggest the excitement and terror of the modern megacity. In contrast, the second movement examines the particular voice and private experiences of a single person—in fact my aunt, age 70, reminiscing about her childhood. The harmonic material there is all derived from the melody of her speech, in particular the phrase "and this is me, when I was six".

I'm currently working on a piece using voices recorded from a cross-section of the community in the North East of England, and I hope to produce a one-hour piece that keeps the listener engaged. This presents an interesting visibility problem. I've recorded the voices of adults, aged between 23 and 93, and of children as

young as 5, who may never have been to a concert music event before, even less a contemporary art-music event. But I expect most of them will want to hear what I've done with their voices. So the piece has to work in a local context where people will recognise both themselves and the spoken content, but also in a concert in, say, Berlin or Tokyo.

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So, to conclude, my aim in this talk has been to trigger some responses to these five fundamental questions about the sort of music we make—the questions of access, repertoire, visibility, stability, and aesthetics. I trust I've not offended too many people by the way I've presented these questions, and I hope that there might be some fruitful spin off from what I've said today.

TREVOR WISHART

August 2008

ICMC 2009 Keynote Address: Reflections on Spent Time

by Paul Lansky
given at McGill University, Montreal, Canada
August 18, 2009

From the circumstances it would appear that this is supposed to be a valedictory speech, and I think it probably is. About two or three years ago, after spending nearly forty years doing little but computer music, I found myself doing none, and came to the realization that as a senior I had probably changed my major. At any rate, I had reached a point where I felt that I had finished one thing and started another. The plain truth is that I just wanted to do something new and different, something for which I needed new skills and computer music no longer filled that bill. Gary Scavone's invitation to me to give this keynote came about because of a *New York Times* article last August (8/03/08) that itself was a result of some liner notes I had written for a CD of instrumental music I issued in 2007 (*Etudes and Parodies*, Bridge Records CD 9222) in which I described a backwards journey of a sort. In it I said, "At an age when most young composers are learning … the difference between *sul pont* and *sul tasto*, I was … learning … to scale the output of a two-pole feedback filter in Fortran IV, … and when I looked up I was no longer a young composer." I went on to say that now I'm at an age where I once more can get into the movies cheaply and I find myself in the shoes of a young composer, learning the intricacies of preparing an orchestra score and similar things I would have learned forty years earlier had I not turned down that particular avenue. The *Times* writer, Dan Wakin, said my liner notes read like a manifesto, which was not my intention. But, who can resist a feature article in the Arts and Leisure section of the Sunday *N.Y. Times*, so I agreed to submit to an interview. In my conversations with Wakin I confessed that I wasn't a big fan of "electronic" music and took some trouble to explain that the beauty of the computer was that it could rise above any particular genre. This got elided in the published interview and I caught quite a bit of flak in the blogosphere where the general response to the article was interesting. My favorite was something like "Next time I make an aesthetic decision, remind me to hold a press conference." Other reactions were a little subtler. Typical was, "well, I do both instrumental and electronic music, it's no big deal and I don't see what the fuss is about." Well, we each have our own way of working and in my case I find that I am not good at multitasking.

It's in my nature to take control and (metaphorically) design the cars I drive, which led me to write Cmix, RT, and a few other software tools that I used heavily for many years. This added a lot of time to the compositional process. But the fact remains that for about 40 years I spent ninety percent of my composing energy working with computers, produced a large body of work, of which I'm proud, and then well into my 60's found myself leaving this exciting arena for other pastures. So I suppose this is a valedictory speech. This is the twenty-third ICMC I've attended and I'm ostensibly here to say goodbye and offer some wisdom. I can't help feeling a small pang over all the time I spent developing extensive skills I may no longer use, but I console myself with the realization that I put it all to good use, and that a newer generation has a whole new toolkit that I would have to learn were I to stay current. I won't say that I'll never do any more computer music, although it seems unlikely. (One of my friends quipped that if I did return I might get another featured *Times* article).

It's interesting to note that exactly twenty years ago I gave the keynote at the ICMC in Ohio State, where I rigged up an interactive piece that reshaped my speech into music using Roger Dannenberg's MIDI ToolKit, an IVL Pitchrider and a Yamaha TX816. I said that if the audience wasn't interested in what I was saying, they could listen instead to the music of what I'm saying. At this point I forgot what I said (knowing Roger I'm sure that CMT is still available, but I can't find the text of my talk). All I remember is that we had some problems with the Yamaha. It certainly wasn't a valedictory speech and it probably wasn't very interesting and consisted of future-gazing about unlimited possibilities for music thanks to new technologies. But that was another day.

What I would like to talk about today, however, are my perspectives on the developments in digital technology over this forty year span, not from a "gee-whiz isn't it great what we can do now that we couldn't do then" point of view but rather from a perspective positioned on a table of musical concerns. Music of course changes at a much slower rate than technology, but it has always responded to it in interesting ways. I want to look at things from this perspective and attempt to evaluate the ways in which I, as a composer, was motivated to invent the music I did. It's very important to me that the music comes first and that it overshadows its machinery. I've never been comfortable with glib demonstrations of the power of a new technology, particularly the kind in which the exhibitor runs through the equivalent of a few arpeggios. If we're going to take new technology seriously it's always

worth remembering Bach's response to the development of tempered tuning. So, my talk will be partly autobiographical and I'll try to use music as a reflection of perspective. A lot of this will be personal and anecdotal. I probably have no profound and deep wisdom to offer and all I can tell you is how things appeared to me and what I tried to do.

Let me flash back now to the fall of 1966 when I entered the graduate program at Princeton. These were very heady times in the musical world (pun intended). The paroxysms of postwar music had come to a boil and the world was full of institutions staking claims to hegemonic superiority, with Princeton perhaps leading the pack in America. Stravinsky had become a card-carrying 12-tone composer and my first week at Princeton coincided with a visit by him for the premiere of his *Requiem Canticles* at McCarter Theater. The work was commissioned by Stanley Seeger, a Princeton alumnus, in memory of his mother. We all felt a kind of glee and sense of superiority: the future was ours and the rest of the world would come to its senses eventually and jump aboard. Even Aaron Copland was writing 12-tone music. (A well-known performer of new music was reportedly raising his children listening to nothing but 12-tone music.) It is hard to exaggerate the influence and brilliance of Milton Babbitt at that point. He was just 50, had hit his stride, and gave wonderful seminars on the theoretical and mathematical aspects of the 12-tone system, and was writing scintillating pieces. Required reading was Nelson Goodman, Rudolf Carnap, Quine and others. The famous *Princeton Seminars in Advanced Musical Studies* had taken place in 1959 and 1960 (that led to the *Musical Quarterly* issue and book appropriately entitled *Problems of Modern Music*), and *Perspectives of New Music* had just been launched in 1964 at Princeton University Press, supported by Paul Fromm. Issue number 1 contained a landmark article by Babbitt, entitled "Twelve-tone Rhythmic Structure and the Electronic Medium." The article basically describes a way of organizing rhythm that is parallel to the 12-tone system's way of organizing pitch, and is really only possible to do accurately on a machine. The opening paragraph of this article beautifully captures both the spirit of the times as well Babbitt's brilliance at articulating it.

> To proceed from an assertion of what music has been to an assertion of what music, therefore, must be, is to commit a familiar fallacy; to proceed from an assertion of the properties of the electronic medium to an assertion of what music produced by this medium therefore must be, is not only to commit the same fallacy (and thus do fallacies

> make strange bedfellows), but to misconstrue that compositional revolution of which the electronic medium has been the enabling instrument. For this revolution has effected, summarily and almost completely, a transfer of the limits of musical composition from the limits of the non-electronic medium and the human performer, not to the limits of this most extensive and flexible of media but to those more restrictive, more intricate, far less well understood limits; the perceptual and conceptual capacities of the human auditor (*Perspectives of New Music*, 1/1, p. 49).

(In characteristic Babbitt style, this paragraph consists of only two sentences.) Babbitt's point was simple and elegant, our ability to hear and perceive complex structures is not necessarily correlated with our ability to perform them, and the electronic medium is a vehicle to explore this dichotomy. He had a very persuasive set of demonstration tapes created on the RCA synthesizer that he brought into seminar to prove this. Little did I realize it at the time, but in a few years this dialectic would be would be one of the first that would break for me as I came to question these concepts of complexity and the relevance of the modes of perception he was concerned with. It is not my intention, however, to demean or belittle the spirit of these times and its avatars. These were exciting days. We felt that we were on the forefront of a real revolution. Perhaps I'm just remembering the excitement of being twenty-two and coming into a new high-powered environment, but as I look back I'm certain that something unusual was going on. Princeton was a 'happening' place. We had a series of British visitors, Harrison Birtwistle, Bernard Rands, Jonathan Harvey and others who came to Princeton to feel the flame. (Jonathan was one of the first people to create a convincing computer piece with the clunky machinery I'll shortly describe. I was impressed.) In retrospect I think that whatever one's feelings are about post-war serialism, the results of this moment are still felt today in a variety of ways, principally in our willingness to accept the idea that music reserves the right to challenge the boundaries of our appreciation, and perception.

The RCA synthesizer had recently become the centerpiece of the Columbia-Princeton Electronic Music Center, founded in 1959 through a grant from the Rockefeller Foundation, and when the decision was made to house it on 125th street at Columbia rather than at Princeton, this set off a chain of consequential events, principally that Princeton composers eager to work with electronic music turned to the computer.

They had, in fact, little choice.

This was the context in which I enrolled in a graduate seminar in computer synthesis taught by a young genius named Godfrey Winham. All that we had at Princeton to staff our branch office of the Columbia-Princeton Center were two Ampex tape machines and a pair of Buchla 100 series synthesizers, thanks to the generosity of Max Mathews and Vladimir Ussachevsky, respectively. The Buchlas, however, were not consonant with Babbitt's vision of the precision of the electronic medium. Though I may be misinformed, it seemed at the time that all one could do with these new Buchla boxes was patch voltage-control generators together to get dizzying electronic swirls. As far as I remember, it would have been hard to synthesize the set of the Schoenberg 4th quartet in quarter notes, the anthem of Babbitt's 12-tone seminar. Of course Mort Subotnick proved a year later that the Buchla was capable of making exciting music, and Wendy Carlos, in 1968, on Moog hardware, showed that music with traditional syntax, if not a breeze, was at least possible. Princeton had recently upgraded to an IBM 7094 computer, which everyone was free to use, and Max Mathews had given us a digital-to-analog convertor, which unfortunately was no longer functional by the time I arrived. Godfrey's seminar was exciting. Charles Dodge came down from Columbia for it and we had a varied assortment of characters there, including one who was interested in exploring the aesthetics of car crashes. Since the convertors were no longer working we had to drive to Bell Labs to convert our tapes, again thanks to the hospitality of Max Matthews. (Those who have driven on 2-lane roads through central New Jersey will realize that this was not a relaxing trip. As a junior member of the club it was often my job to take people's digital tapes to Bell Labs for conversion, and eight or nine 800BPI digital tapes was an armful.) We were using an assembler macro language called BEFAP to run a version of Music 4B that Max had helped us install. Tuck Howe, as an undergraduate, had done some of the heavy lifting to get this all going. I was very excited by the possibilities. Now I could really explore Babbitt's vision. After a few months of fumbling I began to work on a piece that used combinatorial tetrachords (4 note chords with no major 3rds that can thus combine with transpositions of themselves to form aggregates—combinatoriality was at the heart of the new revolution.) I then designed a system of formants tuned in major thirds so that there would be a functional relation between the particular transposition of a tetrachord and its timbre. I also had some sort of rhythmic scheme going but I forget the details. I would play my efforts for Milton, with whom I was studying at the time, and

with his excellent ears he would pick apart pitches and issues in the upper registers, though I could never get him to risk broader criticisms. I worked on this for over a year until one day while listening to it I forced myself to admit that it just sounded terrible, and tossed it. While this was a daunting move for a twenty-three-year-old would-be composer, it was also very liberating. My tread felt much lighter all of a sudden. (I would love to be able to play this for you but I scoured my closet and think it's long gone—trust me, it was ugly.) But I kept hope alive by listening to J.K. Randall's *Lyric Variations* for violin and computer, written for Paul Zukofsky, which I still consider one of the best early pieces of computer music, and was also made shlepping tapes to Bell Labs. Here is an effective moment when the violin re-enters after a computer passage of about five minutes.

Example 1:
http://paullansky.org/icmc/randall-lyricvar.mp3

This piece seemed to me to epitomize what was newly possible and had a kind of seriousness and tone that was inspiring. The second five minutes of the piece took nine hours to compute on the IBM 7094, and that was at a sampling rate of 20k (and it was not a batch-processing machine). (It's interesting to note that Jim Randall has just turned 80 and is obsessed with creating pieces with Sibelius notation software and a MIDI synthesizer. I refer you to his CDs on Open Space.)

It is worth noting at this point that the scene I am describing is somewhat different than what was going on elsewhere at the time. We were not engaged in spectral explorations, as they were at Stanford, for example, much to their credit and eventual profit, or in algorithmic composition as at the University of Illinois. In fact, one of Milton Babbitt's well-known aphorisms was "No sound grows old faster than a new sound." Nor were we trying to break cultural or avant-garde boundaries. We were really interest in the domain described by Babbitt's vision. And the computer seemed then to be the ideal tool for this effort.

My first encounter with digital synthesis thus had the effect of beating my head against a brick wall. It was unsatisfying from every point of view. I decided to retreat to more traditional domains, which also proved frustrating and difficult. A forty-five minute string quartet got me pats on the back, but I knew it wasn't very good. I then got involved in collaboration with my former teacher George Perle (who recently passed away at the age of 93) on what was to become his system of "12-tone tonality". This occupied me from 1969 until 1973, and I wrote a

number of instrumental pieces using it, only one of which survives, entitled *Modal Fantasy*, for solo piano. In 1973 after the arrival of our own D-A convertors and Barry Vercoe's Music 360 language, written to run on our new multi-million dollar, gold-plated, IBM 360/91 (with a whole megabyte of memory!) I decided to give the computer another whirl and again dived into pitch-manipulation, creating an 18-minute piece based on a 3-dimensional pitch-class array using the methods Perle and I had devised. The array was formed by a 0258 tetrachord and its inversion, in other words the 'Tristan Chord' and the 'dominant 7th'. This was also partly inspired by Ben Boretz' massive dissertation *MetaVariations* which was thundering around the halls of Princeton and had an extended section on the syntax of *Tristan*. With typical juvenile hubris I called it my piece *mild und leise*. Here is the first minute:

Example 2:
http://paullansky.org/icmc/mild_und_leise.segment.mp3

Now I really felt as if I had accomplished something. It took a year to complete and I sweated bullets over every note. It won an ISCM recording competition in 1975 and was issued on a Columbia/Odyssey LP (*Electronic Music Winners*, Columbia/Odyssey, Y34149). Twenty five years later, Jonny Greenwood of Radiohead would come across it in a used record store, and the four chord sequence that ends the passage you just heard would make its way into the song "Idioteque" on their 2000 Album *Kid A*. As a result it has unfortunately become my most famous piece. (Until I corrected it, the Wikipedia entry for *mild und leise* only referred to my piece rather than to one of the most famous arias in the history of opera.)

One of the first things I noticed about this experience was not so much the joy of having a loyal and faithful performer in the computer, but rather that it improved my musical social life as I was able to play excerpts from the work in progress for friends, students and colleagues. I no longer had to wait for a concert and the composer's dreaded 'perp-walk' as people dive for the exits to avoid having to say something to you. While I was proud and pleased with the piece, I did notice two things that I eventually came to consider problems. First, the timbral space was too limited. I was using frequency modulation, as it had just been developed at Stanford (John Chowning's famous AES article had just been published, *Journal of the Audio Engineering Society* 21(7): 526-34), and a special arbitrary frequency response filter-design program written by Ken Steiglitz. I found the world behind the loudspeakers to be increasingly artificial and confined. Second, I noticed that there was decay in

the listening experience. What seemed lively and exciting on first hearing became less so on repeated listenings. This, of course, is an endemic problem with tape music and recording in general, and was not accounted for in Babbitt's vision. (Although I did notice that recordings of live music decayed a lot more slowly than electronic music. Was there something about the music that was responsible for this?)

And there were a whole bunch of compositional issues. Far from reinforcing Babbitt's conception, my frustrations seemed to contradict it. I became disillusioned with an approach to composition, furthermore, where one constructed the theoretical basis for a piece before composing it. Second, the world encapsulated by the loudspeakers began to feel 2-dimensional. Years later I would come to feel that there are two basic ways to look at the role of loudspeakers: as instruments themselves or as windows into a virtual space. This piece was lively in neither domain. I also felt that there was a problem in my approach in that it placed a much larger premium on pitch than on timbre. What was coming out had lots of sophistication in terms of harmony and counterpoint but the timbral landscape seemed like a placeholder. I began to wonder if, in fact, 'the search for new sounds' wasn't such a bad idea after all. This led to my first piece using Linear Predictive Coding, *Artifice*, in 1976. I had enjoyed Charles Dodge's *Speech Songs* and decided to give it a whirl. Godfrey Winham and Ken Steiglitz had been experimenting with it and had written Fortran subroutines to do the math.

Example 3:
http://paullansky.org/icmc/artifice.segment.mp3

The piece attacked both of the issues I felt were problems in *mild und leise*. First it was highly motivic rather than being based on a precompositional scheme, and it was all about an exploration of vocal timbre. I think that ultimately it fails because both domains are too limited and it dwells too heavily on extensive manipulations of a small amount of data. But, for me it was a game changing experience.

LPC seemed like such a good idea at the time. Despite its obvious shortcomings it was exciting to imagine being free of the binding of pitch, rhythm and timbre. So, in 1978 I decided to give it another try with my *Six Fantasies on a Poem by Thomas Campion*. What is interesting here is that my motivation for doing the piece had very little to do with the lure of the machine, although it was certainly the capabilities of the computer and LPC in particular that enabled me to think in these terms. It all began, rather, with

a seminar at Princeton on poetry and music led by the poet Lawrence Wieder. He introduced us to the Campion poem, *Rose-cheekt Lawra*, as, per Campion's stated intention, an effort to create qualitative verse in English as in Latin, where stress is created by vowels rather than consonants.

Rose-cheekt Lawra, come
Sing thou smoothly with thy beawties
Silent musick, either other
Sweetely gracing.

Lovely formes do flowe
From concent devinely framed,
Heav'n is musick, and thy beawties
Birth is heavenly.

These dull notes we sing
Discords neede for helps to grace them,
Only beawty purely loving
Knowes no discord:

But still mooves delight
Like cleare springs renu'd by flowing,
Ever perfect, ever in them-
selves eternall.

Observations in the Art of English Poesie, 1602

It struck me right away that to sing this poem would most likely flatten out its roll around the vowel box and that what I was really interested in was exploring the spoken text. LPC seemed to provide an ideal way of finding its inner music by orchestrating a spoken rendition of the poem. The poem, what's more, talks about implicit music and this was a nice conceit as well. Here are two settings of the opening quatrain from movements 1 and 4:

Example 4:
http://paullansky.org/icmc/campion-fan1.mp3

Example 5:
http://paullansky.org/icmc/campion-fan4.mp3

What I thought then, and still think now, is that part of the success of the piece lies in the way that it rises above the illusion of machine magic and manages to use the computer to make a larger point about the intricacies of human speech. This piece also opened my eyes to the real genius of the computer: its generalized ability to implement mathematics in software. It dawned on me at that moment that there was no music-making wizard lurking behind a curtain; everything resided in software and know-how. Tweaking LPC was a laborious task, and most of it was done by hand. My object was simply to make it as realistic as possible, while taking advantage of the freedom from the binding of tempo, timbre and pitch. (It's with more than a little peevishness that I take in the current uses of Auto-Tune, which I'm told uses LPC, via Cher

or Lil Wayne. They seem to revel in just the faults of LPC that I tried so hard to avoid. I also notice the crummy nature of cell-phone transmissions, some of which apparently use LPC.) I developed a reputation for being good at LPC but in fact all I was doing is orchestrating around its weaknesses. One doesn't generally score music on an oboe that was written for a harpsichord, for example. Another interesting insight gleaned in the first ten or so years of the piece's life came from people's response when I told them that the piece was made at a 14k sampling rate. They consistently said something like, "that's surprising, it sounds so good." It was as if there was an explicit connection between audio and musical quality. (On the other hand, I can never understand how people could listen to those old scratchy mono 78's.) Finally, it quickly dawned on me that this was specifically not related to Babbitt's vision. It was not so much opposite as it was orthogonally related—it was just different. Rather than using super-human machine capabilities I was interested in teasing out those qualities in my wife Hannah Mackay's voice that made her reading particularly sensitive, and human. The metaphor that I came up with at that point and used for many years was that the computer now seemed to me to be more like a microscope than a synthesizer. And, an idea that threads through almost all my work from this moment on seems to be the creation of a virtual space within the loudspeakers; a concern that my sounds create the illusion of having a physical source, one that involves motion and energy. This is where I think I draw a difference with *musique concrète* and a lot of terrific work that people have done involving spectral manipulation. I want to create the illusion that someone is back there banging, blowing, or beating something recognizable.

Despite my earlier promise, I'd like now to spend a few moments reflecting on the struggles we had to get anything done in the years prior to the arrival of the NeXT machine. This is not so much meant to demonstrate how great things are now but rather to draw a picture of our relations with the computer during those years. In 1978 the ICMC was just a few years old and personal computers hadn't even been imagined. Nobody dreamed of ever interacting with a machine in real time, and most who were interested had to struggle to even get access to a computer. I gave a lot of talks and demos in those days and it didn't feel good. I was from a wealthy institution and had lots of access and freedom. Jealousy was the most frequent subtext I sensed behind admiration. It was a paradoxical situation. I was trying to create interesting music but all most could hear was the fact that it was made on a computer, and a big and expensive one at that. Moreover,

until the early 1990's I would estimate, a significant part of ICMC talk consisted of bragging. "We've got a VAX", wow. I remember photos of people proudly standing by their newly acquired hardware: "We've got over 600 megabytes of disc storage." And, those here under forty probably don't remember the agony of getting a D-A convertor to work. One of the longest nights of my life was spent with an engineer and an oscilloscope hooked to a D-A circuit board, timing things and trying to see how many PDP11 *mov* instructions I could squeeze into a single sample period. It was not long after that that I read Tracy Kidder's book, *The Soul of a New Machine*, and my heart went out to the engineer who vanished leaving only a note saying that he had gone to where he would contemplate no length of time shorter than a season. I won't even go into the deflationary cost of disk storage except to remember that we spent about $30,000 in 1986 for a pair of Fujitsu Eagles totaling about 700 megabytes of storage (and requiring air conditioning). (We're now at about 10 cents a gigabyte. You do the math.)

Another thing the younger generation won't remember is the extent to which we were still living in an analog world. My *Campion Fantasies*, done at a 14k sampling rate, were captured on a Scully tape machine that added a noticeable hiss. Then when it was issued on an LP my beloved, noisy 5th movement sounded like garbage. My father, who was a recording engineer, told me that I was getting "inner diameter distortion" as the angle of the stylus to the grooves grew closer to the perpendicular. It was a landmark moment for me when I first saw someone play a CD on a Mac laptop. The convergence of audio and computing had finally arrived. This changed everything.

The point of this digression is to draw a picture of the relations we all had to musical computing prior to the advent of the NeXT machine in 1989, and in retrospect the extent to which NeXT changed the game. It was a daunting task to get access to the machines, let alone make them go beep. But we felt that we were part of a revolution and that it was all worth it. On the other hand the distractions were so numerous, both from the perspective of power and access as well as from jealousy and resentment, that I often found the music getting lost in the mix. On top of that labor costs were very high. In 1982 I spent six months writing an i/o driver for the convertors I just mentioned and we ended up using them for about a year. Nevertheless we all saw the computer as opening up new musical vistas that we hadn't imagined before, and it did.

The next significant chapter in the evolution of my relation to the machine

came in 1985 when I wrote *Idle Chatter*, now using the University's IBM 3081 mainframe.

Example 6:
http://paullansky.org/icmc/idlechatter-seg.mp3

I was still struggling with the classical problem of 'tape music', the fact that it's the same every time, and that the music grows less interesting with repeated listening. *Idle Chatter* uses a kind of stochastic distribution, random selection without replacement, of LPC-synthesized voice fragments in which words are edited so that they are unintelligible and the pitch contours are slightly flattened so that in the aggregate they have recognizable pitches. The first thing I noticed about it was that everyone had a different reaction to it. Some tried to parse the words, some the rhythm, some the texture. The only thing nobody had any trouble with was the harmony, which begins the piece in a pretty simple F major tonality. I had originally intended to use more complex harmonies but found the listening experience much too exhausting. This, in fact, marked the beginning of my increasing interest in tonality. What is ironic is that tonality was initially not anything more than a way to have a placeholder so that complexity could reside in other domains. It's also ironic that it was the computer that gave me the freedom to do this. Had I written a string quartet in F major in 1984 at Princeton I would have been greeted with polite stares, at best. What was noticeable, however, was that my listeners had to do some work while they listened. The combination of this and the random textures seemed to be a step in the right direction with respect to the problem of decay.

I like to think of this as the moment I hit my stride. While I continued to search for other ways to work, I now had acquired a vocabulary of creative options that made dealing with the computer more of a musical than a technological experience.

Several other threads that I followed were reimaging familiar sounds, as in *Night Traffic* and *Smalltalk*, physical modeling (of which LPC is an instance), simple speech, without LPC, as in *Now and Then* and *Things She Carried*, and modeling live performance, as in *Heavy Set* and *Folk Images*. Here again paradox arises in that all these approaches are emulating and transforming sounds of the natural world. In retrospect they seem to be an attempt to humanize the music and neutralize any machine-like tendencies, or in other words, hide the computer. I also seemed to be intent on rubbing against the grain, doing things that were not indigenous to the machine. Earlier, in the 1980's I did a set of folk-song settings using LPC on

a violin sample. Here is the opening of a folk-like piece I called *Pine Ridge*.

Example 7:
http://paullansky.org/icmc/pineridge.mp3

(For this work Ken Steiglitz figured out how to shift the formants in LPC, allowing me to create a 'cello out of a violin, for example.) I was interested, almost vicariously, in the subtle things that good performers do naturally. For the violin sample I wrote a short piece for solo violin and recorded a performance of it by Cyrus Stevens. The experience taught me a lot about the violin, such as the fact that vibrato consists of a lot more than amplitude and frequency modulation, and that there is rich noise in the sound of the bow being dragged across the string. I also learned that the pulse-like excitation function of LPC, designed to model the vocal tract, was not so great for bowed strings. It would be twenty-five years before I would work up the courage to write for string orchestra, but it was clear even then that there was an aspect to my computer work that consisted of wishful thinking.

In *Night Traffic* I created a Strauss-like harmonic landscape for the sounds of cars passing:

Example 8:
http://paullansky.org/icmc/nighttraffic-seg.mp3

I learned a lot from this. First, that traffic noise is inherently ugly; second, that by using a romantic harmonic landscape I could create an almost operatic scenario from an unlikely source (my colleague Ken Levy called the piece *Tod und Verklärung* on wheels)—my big breakthrough on the piece came while watching *Twin Peaks*, from which I blatantly stole the opening chord sequence—and finally I learned the evils of DC bias.

And in *Smalltalk*, I raked plucked string filters over the quotidian sounds of casual conversation:

Example 9:
http://paullansky.org/icmc/smalltalk-seg.mp3

(The analog domain pokes its head in here as well in the form of high frequency pixie dust coming from the Sony Walkman cassette player I used to record the source.) There is an implicit tension in these pieces between Brahms and Cage. On one hand I'm interested in the music of everyday life, while on the other, very traditional musical values form the bed on which the images lie. The machine in these cases is probably more mediator than anything else. This is not to understate its power but rather to

think of it more as a puppet master than virtuoso performer.

Physical modeling, on the other hand, exercised my interest in the complexities of real instruments. In this instance, from *Still Time*, I luxuriated in the glories of superhuman flutes, thanks to Perry Cook's slide flute model.

Example 10:
http://paullansky.org/icmc/stilltime-seq.mp3

But once again I spent way too much time worrying about all the things that real instruments did that I couldn't manage.

One of the most recent works I did is an interactive piece for five laptops, written for the Princeton Laptop Orkestra (PLOrk) called *A Guy Walks Into a Modal Bar*. The title refers to my port to SuperCollider of a number of Cook/Scavone STK physical models, the modal bar ones in particular. This excerpt is from a movement called *Mbira Madness*. (The mbira model is not from STK, it's someone's clever SC3 patch, although a number of the other sounds are from STK.)

Example 11:
http://paullansky.org/icmc/mbira-seg.mp3

This doesn't sound much like an Mbira of course, but this is probably due more to tuning than timbre. (If I had tried to emulate the tuning I probably would have been susceptible to a charge of cultural imperialism, which I take much more seriously than undue physical modeling.)

Finally, I have two examples of rather blatant physical wishful thinking. The first is from a piece that constructs an algorithmic model of an improvising pianist with very big hands. This, again, is an attempt to get into the skin of human performers. It's called *Heavy Set*.

Example 12:
http://paullansky.org/icmc/heavyset-seg.mp3

The piano is thanks to Kurzweil. The results would be different with different random seeds, of course, but I routinely used my family member's birthdays and couldn't break faith with that. I'm very proud of my flat-third algorithm and wish that I could write real piano music that flowed this smoothly.

And last, here is a segment of an ersatz orchestra piece, called *Chords*:

Example 13:
http://paullansky.org/icmc/chords-seg.mp3

This was made by granulating the SGI sample library. When I wrote it I was certain that this was the closest I'd get to writing a real orchestra piece. As we speak, I'm in the process of finishing one and began it, in fact, by doing a transcription of this piece and attempting to orchestrate it, a task at which I failed, giving me a little more confidence in the efficacy of this computer piece as well as new insight into the complexities of writing orchestra music.

So, what originally began for me in 1966 as an attempt to bypass the frailties of human performance and traditional instruments ended up as a way to glorify just these things. At the end of the day, moreover, I think it is the computer that created my intense interest in the qualities of everyday, unmediated sounds. Thus when I found myself writing music that didn't involve electricity it didn't so much seem to be abandoning the realms of physical modeling and machine performance as much as it felt as if I had my hands on those things that I was grasping for in my computer work. The challenges are of course entirely different. Now instead of worrying about distortion in the high register I worry about page turns. Instead of worrying about debugging software I worry about rehearsal schedules. But a lot feels familiar. I wrote a percussion quartet for So Percussion. When they asked me to do it I objected, saying that I had never written for percussion before and worried that I'd be alone on the island with only a loincloth. They objected, citing *Table's Clear* as a terrific percussion piece. What surprised and pleased me, however, was how familiar writing for human percussionists felt. I had to pay attention to spectral envelopes, registral transients and balances, masking and interference, spatial distribution and so on. The basic difference was that rather than trying to create an impression of physical activity I found myself actually choreographing it. And, now that I'm doing what I swore I would never do, write orchestral music, things feel familiar in the same way.

I view my work as a constant attempt to 'get it right', as most of us do, to find and express the implicit music within me rather than within an instrument or machine. In almost all the pieces I've done I have the feeling of *almost* getting it right, but not quite. And the process over the years has been akin to getting better at almost getting it right. I found at the end of my time working with computer music that this process had ceased in a sense. I was good enough at it to get what I wanted and while I wouldn't claim that my later pieces were any better than my earlier ones I did feel that just the sense of getting better at something was gone, and 'getting it right' was no longer the main issue. Now, however, I find myself

clinging by my fingernails to the bottom of a very steep cliff. It's frustrating to begin a climb with the realization that I don't have the seemingly unlimited years ahead of me that I did when I was 35, but nevertheless the process of climbing the wall is exhilarating.

If I do have any valedictory wisdom it's this: the real genius of the computer lies in its ability to intervene and operate on many different levels and in many different ways. I think that one of the problems with conferences like this is that there is an implicit pressure to demonstrate technological muscle. I'd run out of fingers and toes many times over were I able to recall all the conversations I've heard in these and similar halls that faulted an otherwise lovely piece for its simple-minded use of technology. While it is true that the function of these conferences is to exhibit advances in technology, music sometimes suffers in the process. I guess my advice then is in the form of a recommendation to feel free to use whatever computing resources seem musically appropriate, from the complex to the simple, and even, as in my case, to choose not to use them at all.

An Interview with Eliane Radigue

by Bob Gluck

Eliane Radigue is a French composer of electronic music and a student of Tibetan Buddhism. Her work has been played in galleries, museums, on the radio and at festivals throughout the world. I spoke with her by phone as part of an oral history project regarding the electronic music studio at New York University, which operated during the late 1960s and early 1970s. It began as Morton Subotnick's private studio, to which he invited composers to freely use. Our conversation began with her earliest work and continued through her time at NYU, her return to Paris, and a period spent at California Institute of the Arts in 1973. We then discussed her aesthetics, compositional approach, and rationale for her choices of synthesizers. The interview took place on November 16, 2008.

Learning electronic music in Paris

I was educated by Pierre Schaeffer and by Pierre Henry, at Studio d'essai in Paris. This was in 1955-57. There was no formal instruction at the time, and so I learned about tape editing, looping, and mixing techniques by doing actual work. By that time, it was called *musique concrète*.

I had to leave Paris for family reasons and as a result, couldn't find equipment on which to work. Equipment was very expensive at the time. I returned to Paris in 1967, and Pierre Henry asked me to be his assistant. Doing this for a year brought me to what I really wanted to do. Working with Pierre Henry, you really come to know about the tape medium. Henry was working with recorded sounds and he saw himself as a "hunter of sounds."

Exploring tape feedback techniques

By this time, my interest in electronic sounds was growing, particularly in feedback effects that happened between two tape recorders or when microphones and loudspeakers were placed in proximity. Several musicians, like David Tudor, were already doing this at the time. Learning to keep a microphone and speaker at the right distance apart was something that evolved for me. By accident, I discovered that you could slightly change the sound by putting one finger very lightly on a knob on the recording system. Learning to control the accuracy and care of sounds in these ways gave me a way of working and thinking about sound. I was fascinated in particular by the sounds produced by beats and the sensations that were produced by these means.

After the year assisting Pierre Henry, I started working independently. I gave up composing by means of recorded sounds. I was now mainly using electronic sounds produced by the relatively primitive means of the time and recording them. This musical vocabulary led me to a new type of work. My appreciation of beats and other natural effects grew.

In New York City and the NYU studio

I started going to New York in the early 1960s. I was married at that time. My husband, a painter and the father of my children, once brought us there on a one-year contract with a gallery. I got to know James Tenney, who became very important in my life. Through him I got to know David Tudor, John Cage and others in the very active, intense New York life of that era. I went to music or dance concerts every night. The artists Bob Rauschenberg and Andy Warhol were my friends. I came to know Steve Reich, Phil Glass and Jon Gibson. During the time when I met them, Steve and Phil were working together.

It was a few years later that I again lived in New York, from September 1970 to June 1971. It was then that I worked in the NYU studio. I lived on the Bowery, near 8th Street. My life was divided between time in my loft with my children and time in the studio. I had a French friend who was married to an American man, and then there were my children. Sometimes, composers would invite people to their studios for rehearsals. But except for visits from friends, I didn't have a life beyond the studio and my children.

Discovering the Buchla at NYU

Steve Reich introduced me to Michael Czaijowsky, who invited me to the studio at NYU. I wanted to go there because it had a modular synthesizer that was accessible for use. Where in France could you find one [of those]? Laurie Spiegel and Rhys Chatham were there during the same period and we crossed paths in the studio from time to time.

Meeting the Buchla was the beginning of a great love affair. Oh my God! The first three months were difficult since there was no documentation. I had seen Michael Czaijowsky work at it only once and I hadn't yet met Rhys Chatham. The difference between working with audio on tape and voltage control, interconnecting the plugs and modules: the simplest thing required new learning. Of course we all knew how to use tape recorders. But it took three months to make our own discoveries; it took that much time to sort out what I wanted from the effects that I rejected. But sound was easier to produce with the Buchla than it was with tape. My goal at the time was to work and tame the synthesizer. My first piece on synthesizer

was played on April 6, 1971 at the New York Cultural Center, on 59th Street and Central Park South. It was called *Chryptus*.

There were not many opportunities to meet the other people who worked in the studio. Except for brief, occasional meetings at the door, we didn't see one another. We blocked out our studio times on a scheduling board on the wall. We had to be ready to leave when the next person arrived. I got to know Rhys and Laurie because they came to my concert at the New York Cultural Center. Rhys called me afterwards to say that he had come just to be polite, but really liked it. After that we got together very often, going together to events here or there. I remember one of those concerts, which took place in a swimming pool. It was by the wonderful musician Max Neuhaus.

Through Rhys, I had my first of several annual concerts I did at The Kitchen. It was then in a very small place on Mercer Street, near Washington Square, before it moved to Broome Street. The piece played was *Psi-847*. I also got to know Tom Johnson, who reviewed my concert in the Village Voice. I found the way he wrote about his experience about sound to be very interesting and so I sent him a note thanking him. That's how we came to be friends. I remember hearing a piece of his played by bassist Joelle Leandre, and later in Paris his *Four Note Opera*, which is such an intelligent work.

Returning to Paris

By the end of my year in New York, I realized how hard it was to live there. New York is a tough city. I found the neighborhood where I lived, between Spring Street, Washington Square and Eighth Street, to be charming and exciting. There were many opportunities to go to concerts, sometimes classical, and these were important to me. I remember coming back at night and enjoying the changing sights, the subways, and the metallic sculptures at Times Square station. I had a very good time. I loved the people I met and now my very best friends are mainly from New York or California. But life was too tough and I missed Paris.

Something inside me said that I had to put my roots where they belong. I realized that I was not only French, but in fact, Parisian. My daughters didn't want to live in New York and my mother was in France. In fact, when I was living in New York, I had to return to Paris every three months, just to breathe the pollution of Paris! And so, although I found Paris to be a provincial city upon my return, it was so nice to be back and live there. Until then, I had thought that I could live in any city in the universe, but that's absolutely not true. I was disappointed in myself, but I had to go back, and I did so in June 1971.

Since my son loved the United States and decided to live in New York, I returned nearly annually. I've made many extended trips, sometimes as long as three months at a time.

Choosing the ARP synthesizer

Once I discovered that I could really work with one of these instruments, I looked around at every type of synthesizer available. I decided that the ARP synthesizer was absolutely it. Ever since then, it's been my instrument. Here's why: on the Buchla, it's not easy to keep track of how you've connected the patch cords (all the spaghetti!) and set the position of knobs on the modules. The slightest change would change things. I had my own system of graphs to remember which modules were connected to one another, but it was not easy to remember where you were at a particular time. I liked the way the Buchla sounded; it was a really beautiful instrument of that generation. The Moog was easier to use, but I found the quality of the sounds to be less subtle.

The ARP has very nice sounds, and this was the most important thing. It has very delicate modules, and it is easy to use. The system of matrix switches that interconnect the modules is almost like a musical score. At a glance, you knew where you were and what it was controlling, without going in search of knobs and modules. The only thing I didn't use on the ARP was the keyboard. It could have been useful for composing, but I didn't want to bring it back to France. What I really wanted to do was work with the sounds within the sounds, the parameters of amplitude, modulation, and the like; I was fascinated by working with sound. On the ARP, I found that very slight changes, such as moving a knob very slightly, just a little touch here or there, could result in almost unnoticeable changes in a sound. Also, the ARP filter is really the best I have ever heard. It's a very beautiful module. The ARP and I have been "married" for 40 years.

Tonal uncertainty and ambiguity

The instability of synthesizer oscillators was not a problem for me in the way that it was for others who were doing drones. One could have the same issues on the ARP. The fact is that the matrix switches leaked slightly and the sounds were not precise. But I loved that, since it brought in a kind of uncertainty. I was not looking for specific tonalities; I loved the ambiguity, which was a goal of my work. Of course you can always define a frequency range for the oscillators, but the resulting pitch could be ambiguous: maybe it's a G or an F#, or maybe it's an Ab. The music was floating and very slowly changing. And this requires time, patience, and great accuracy of listening and perception. I have always been very

fascinated by changing mode or tune, sometimes by accident. You can guess where you are, but maybe you are no longer in the preceding tonality. By now it could be another one.

I was also fascinated by the immense power of the partials, the natural harmonic series within a tone. Consider how a piano is made so the bass note produces this incredible energy around the sounds of its harmonics, floating naturally in their own intonation. There is no need for just intonation or equal temperament since the natural harmonics resound in their own way. Over the years I have worked with this, I've discovering that if the tuning is too precise, the result is flat. Two notes even less than a quarter tone apart produce some slight beats, and this fascinated me.

CalArts and the Serge Synthesizer

I visited CalArts at the very beginning. James Tenney was there. I returned there as a composer-in-residence that lasted a few weeks. Then, I got to know Serge Tcherepnin and Charlemagne Palestine. I had the opportunity then to learn about Serge's synthesizer, which had such beautiful sounds. We had a lot of wonderful discussions, especially about the economy of his design. I told him that horizontal, slightly sloped sliders in particular are easier to work on for many hours. Serge agreed with me and after that, many of his instruments followed this configuration. I thought about working with Serge's synthesizer and if I were to use another instrument, it would be Serge's. In 1999, I did an electronic piece at CCMIX, where they have several old analog instruments and I said: "The Serge is the one I want." The most recent piece I completed uses sounds from the Serge and sounds from my ARP, and so it's a kind of wedding between the two! Unfortunately, this was the only time I had to work with this beautiful instrument.

ICMC 2008 Reviews
Sonic Arts Research Centre, Queen's University, Belfast, Northern Ireland

ICMC 2008 Review
by Kazuaki Shiota

I am a composer, and often create music with my algorithmic sound system, {TranSpell}. I have been continuously giving a demonstration of {TranSpell} as well as performing my music at the ICMC since 2006. Recently, I started incorporating movement into {TranSpell}, so I became interested in how to integrate between sound and motion.

ICMC 2008 was the first time I saw the mobile phone orchestra composed by Georg Essl, Henri Penttinen and Ge Wang. The title was *MoPhO: Suite for Mobile Phone Orchestra*, and the performance assured the ability of mobile phones for live electronics and removed the borderline between computer music and mundane life. It was visually interesting and beautiful when the performers moved their hands up and down to transform data.

I was fascinated by the aesthetic performance of *The Color of Waiting*, composed by Margaret Schedel and choreographed by Alison Rootberg. The dancer was holding two light sensors to control the watery sound in real-time. The three blind curtains were hung from the ceiling to be projected upon with the images of eyes and waves. The dancer was not entirely seen in the performance. Most of the time, she was moving across the domain of shadow and light. Thus, the music was well integrated with the motion. Personally, I collaborate with a modern dancer, so the work enlightened me to the practical path to create collaborative works. I am looking forward to seeing further progress on the integrity between sound and motion at the upcoming ICMC 2009 at McGill University.

Kazuaki Shiota
DMA student at University of Cincinnati
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A Life-changing Experience: My Personal Account of ICMC 2008
by Ysbrand Otjes

This story begins with me trying to get back in to my field. After graduation, I fell into a black hole of some sort. I got

a job at a call center and didn't have any contact with anyone from my former college. I didn't like my job and had no use for the knowledge I learned over the course of 4 years being a student at the HKU (Utrecht School of Arts). I contacted a couple of my former fellow students to no avail. Most of them weren't interested in getting back into contact with me, with the exception of Toine. He told me there was a concert of second-year HKU students, and in an act of spontaneity I went. There I met up with him and a former teacher called Hans. They told me about the ICMC and invited me to come along. Toine told me it was going to be at least an experience that would keep me inspired for a year, and at most a life-changing experience. Time slipped by, and the plan nested itself somewhere in the back of my head while I got on with life. After a couple of months I casually contacted Toine to poll if the plan was still standing, only to find that he already planned the whole thing, and if I wanted to come with them I should get on with it, so I did. In one week I got free from work, registered and paid for a ticket for the ICMC, reserved a bed at the same hostel Toine was staying, and booked myself a flight. Two weeks later, I got on the plane, flew to Ireland and landed the same day the ICMC was set to begin.

The first thing I noticed when I arrived in Ireland was that my cell phone didn't work anymore. I could receive calls and texts, but when I tried making calls, I constantly heard, "This number is barred from your phone." Luckily, I had written down the street my hostel was on. So after asking around and going on a slight detour, I arrived at my hostel. However, there was nobody to check me in. I dropped my bags in their laundry room and I decided to get registered at Queen's University, which I had seen earlier when looking around for the hostel. It was a majestic looking castle, and the insides where beautifully groomed. I followed the signs and saw the registration desk. After telling them my name, I got a big bag full of goodies and even the T-shirt that I paid for in advance. Later that week I noticed it even had my name on it—how cool!

I felt a little scared in this huge city in another country and I was proud that I had gotten this far, but I felt it was time to meet up with Toine. I got a text from him, but couldn't text him back. It said that he was already at the university and couldn't meet up with me. I had some unfinished business at the hostel, so after registration I headed back to the hostel. There, I met up with some other students from the HKU and had some dinner.

After having eaten, we went to our first concert session. There I expected some electronic sound exploration, but instead

I got treated with some "electro-acoustic" music, which I didn't really like that much. I thought Colin Johnson's work called *It's All Out There on the Internet* was a very funny and novel idea, but I left the hall with a distinct impression that maybe this wasn't my thing and that it had been a bad idea to go to the ICMC after all. I overreacted, I know, but you have to remember that I was on a bit of an emotional roller coaster—the flying, the huge city, the new social group, the awesome beauty of the university building and then the weird music to which I was not accustomed anymore. It was a bit too much for this poor boy.

The next morning, I went to my first of lecture of the week. It was about sound synthesis. The first topic was "split-sideband synthesis," which was certainly a very interesting concept but wasn't the life-changing lecture I thought it would be. This would continue on. I either didn't understand what they were doing or I couldn't understand the major revolution that their ideas and research would bring to their specific field. My streak of insecurity ended when I visited the Sonic Lab, which is a beautiful room inside the SARC building. Siebe and I were a little bit late for the concert, but we were fortunate enough to sneak in after the second piece, and then I heard a very good piece: *Friction* by Jason Bolte. There were snippets of real world sounds floating above you and all around you in this beautifully dimly lit room. But what I really loved was how these sounds were locked up through what I felt to be the sounds of doors shutting above you. It took me on a very interesting ride, and because the room was pretty dark, none of my other senses could get a hold of my thought process and I got to really enjoy only the surround sounds.

This experience really helped to get my negative feelings about being there in context. At first, I hadn't understood that I was allowed to dislike stuff here. I thought it was all supposed to be light-years ahead of what I learned or experienced at my college. I thought I simply wasn't tuned in to it, or maybe even too dumb to understand what I was hearing. But that simply wasn't the case. They were exactly doing what I was doing at the HKU—research. This wasn't school, it was a community of computer music aficionados and sound/music scholars, and they were just presenting these papers so that others might benefit and build upon their work.

By the time we went to the Black Box that evening to watch an informal live coding event, the negative feelings were reduced to a distant memory. I felt I really connected with the Dutch group I was with, and I really enjoyed the live coding—all of it, from the glitchy

nastiness of Yee-King and the soothing automation of Graham Coleman to the Max/MSP improvisation by our very own Luc van Weelden.

The next day, I looked around the university terrain and went with a couple of the guys to the Sonic Lab. There I heard a wonderful piece. It had surprise, it was immediate, and it was precisely long enough for its intention. It was *Exit Variation 2* by Roger Doyle. As with the all of the concerts, we were handed the program, and one of the pieces had a really interesting title: *Radiant Telemetries: Musical Settings of Celestial Images from the new General Catalog I: NGC2023 (Horse Head Nebula)*. Recently I've taken an interest in what kind of sounds we can hear from space (it being a vacuum and all) and maybe data converted to a wave of some sort. However, we were treated with very poorly executed video effects and a very uninspired piece of music. *Lamentation Alphabet: Aleph* by Benjamin Broening, however, was a very good piece that really utilized the surround system. It sounded warm and organic while still maintaining that technological sub-layer in its sound.

After that, we went to the "Re-inventing audio and music computation for many-core processors" panel, which was very interesting but not really up my alley, because I'm not much of a programmer. However, it was very interesting to discover that the audio/music community is also debating about what to do next and how they can benefit from the change to multi-core processing because of the limit of Moore's law.

The evening again brought us a lot of performances. The one that stood out for me was by Juhani Räisänen and was called *Cringle*, which was an audio-visual piece. Both audio and video were generated live: the sound was synthesized, and the visuals from a camera pointed in his direction were processed in real time. Both the synthesis and the video processing were controlled by this lightsaber-like wireless instrument in his hands, with which he was dancing in front of the camera. It was awe-inspiring, although I have to admit that I liked the visuals better than the music.

Later that night we went to see the performances in Mandela Hall, where the most informal of the performance sessions were held each day. There was music in one room, where you could casually walk in and out, and a bar on the other side, where you could chill. I sat down in the performance room, and noticed all of these radios above our heads. They were for a piece by Anna Friz entitled *Radio is Everywhere in Their Dreams*. It is quite a long piece—30 minutes—and I didn't have the patience to sit down for that time. I have the distinct impression that it wasn't

made for sitting down. Whatever may be the case, I did like it. I enjoyed the use of voices, and the text you hear them say. It projected a beautiful atmosphere of calm and loneliness. Next Matthew Yee-King performed, without a beamer displaying his programming. Too bad—it made it that much more interesting when I saw it the day before, but it wasn't a bad performance by any standard.

On the 28th I attended the Sonic Lab concert, but nothing piqued my interest. The demo sessions were next. We went to the presentation of "Two Network Installations: '1133' & 'Computer_ Voices'" by Vincent Akkermans and Than van Nispen tot Pannerden, two other guys from the Dutch delegation. There I got a chance to see what my old school is up to these days. I found the performances interesting and very interactive, because I really felt the urge to join in.

At the poster presentations, I got a chance to talk to Juhani Räisänen. I got to see, hold and even play his Sormina, the wireless object I described earlier as being like a lightsaber. The Sormina is a really interesting instrument, but the philosophy behind what Juhani is trying to accomplish is even more captivating. He wants his instrument to be devoid of radical changes. This gives performers a chance to really learn to be fluent with it. It gives pieces of music a chance to develop, and it takes the Sormina out of the realm of controllers and into the realm of a real instrument. That is evident in the choice to use wooden knobs on the potmeters and the decorative wooden neckpiece. I also spoke with Enda Bates about his paper "Adapting Polyphonic Pickup Technology For Spatial Music Performance." He explains how to get 6 separated signals—one for each of the strings—out of an electric guitar, and shows his idea to use it in a surround sound performance. It really opens up possibilities, because of the greater control you have over your signal path.

In the meantime, my group was buzzing with excitement for the performance of the Electronic Hammer later that evening. There were three performances, one composed by Henry Vega called *Izumi*, one by Rodrigo Sigal called *Me(n)TAL* and *Music for Snare Drum and Computer* by Cort Lippe. I did like the use of the metallic stool, but the performance as a whole just didn't work for me. The rest of the Dutch group, however, really liked it, and even found the 10 minutes of finding every method of beating on a snare drum fantastic. I can't dispute the fact that the performer is really skilled, but 10 minutes of snare drum is a bit too much for me.

Then some weird gray-haired man walked on stage, took a seat behind an array of bells and cymbals, crouched down, and

fumbled with his hands in his suitcase, only to arise with a thimble on each finger. He started playing the bells as if they were sacred, and treated his daf in a similar fashion, needing to stroke it before playing. The piece was complemented with tastefully placed, but more importantly, musically pleasing electronic sounds. The text really seemed to fit as well, finding the music, and the music finding it. I loved the whole performance; the build-up and the climax were beautiful. It was a piece by Alessandro Cipriani called *Bi Ma* (Devoid of Self), performed majestically by Mahammad Ghavi Helm, who also performed *Altri Passaggi* by Fabio Cifariello Ciardi.

By this time I felt really at ease. I knew what I liked and what I didn't like. In short, I got to know myself, but I got to know a lot of people there as well. I noticed I could just go up to a person, introduce myself and talk about stuff. Everybody earned instant respect from everybody else. I knew that this is where I belonged. I had new hope for my personal future and I vowed then and there that I would be at the next ICMC.

The last day of the ICMC, I went on a small mission to get my hands on all of the *Exit Variations*. They were perhaps the best things I heard at the ICMC, because of their small durations, their innocence and the joy with which I anticipated them every concert. I finally got the info that they would be placed on the website in due time, and that I would be able to download them to listen to them on my MP3 Player.

I also attended my last lecture session of the ICMC, "Algorithmic Composition Tools 3." Here I learned about "The Bigbang Rubette: Gestural Music Composition With Rubato Composer" by Florian Thalmann and Guerino Mazzola. It looked like a really nice method of composing music, and I asked them to contact me when it would be available so I could compose with it.

Then it was the last evening of concerts. It included, of course, the final *Exit Variation*. Also of note was *Oboe_prosthesis* by Michael Young, where Chris Redgate, through his oboe, engaged a neural network, which in turn engaged the improviser. The piece was fascinating to listen to, and I noticed that I could understand what was happening here—something I knew I couldn't have done at the beginning of the ICMC. Georg Hajdu's *Ivresse '84*, with the European Bridges Ensemble and violin by János Négyesy, got an enormous response by the crowd there, including me. It tells the story of an incident that happened in Ivrea in 1984, taken from an interview with the very same János Négyesy. The piece was accompanied by a beamer displaying the actual text and the parts

played by the performers.

In conclusion, my good friend Toine was right. The ICMC was certainly an inspiration for me, and only time will tell if it was a life-changing experience. Now I know where I belong, and I will do everything in my power to stay there.

Concert and Festival Reviews

The GRM in New York City
November 14, 2008
Chelsea Arts Museum

by Sam Pluta

Having lived in New York City for over two years, it would be hard to convince me that any other place has such a diverse wealth of music to choose from every night of the week. From experimental electronic to instrumental, from the Met to Broadway, and from Country to Cajun, everything can be found in this city if you look hard enough. However, if there is one form of music that is significantly underrepresented here, it is multi-channel acousmatic music. There are reasons for this; not only do most institutions lack the required equipment, but suitable venues are in short supply. Most are small and narrow, not allowing for a wide spacing of the side speakers that allows the multichannel setup to work. This is why I was so thrilled that the Electronic Music Foundation was bringing Daniel Teruggi, Marc Battier, and François Bayle to the Chelsea Art Museum to showcase their music. These three gentlemen are members of France's oldest electronic music studio, the Groupe de Recherches Musicales. The organization's fifty-year history has had a dramatic impact not only on electronic music, but also on music in general, and to hear their multi-channel sounds in New York would be a bit of a treat.

The concert was held on the third floor of the museum. The space was sufficiently large and the EMF's sound system, while no BEAST, was acceptable, consisting of 8 speakers in a circle around the audience plus a necessary subwoofer. On the down side, the venue shared a feature with so many wonderful New York venues – road noise. The Chelsea Art Museum borders the West Side Highway, and while we have become accustomed to car horns in our Cage and sirens in our Feldman, a music whose main foci are audiophile sound quality and pristine effects gets somewhat lost in all the noise (a side note – this actually makes so much more sense out of Cage, but is perplexing in the case of Feldman).

On to the music. Daniel Teruggi, the current director of the GRM (though a native Argentinian), started out the concert by presenting his 2006 multi-channel work, *Birds*. The piece was sparse in gesture, but aesthetically and technically gorgeous. The entire twenty-minute or so piece had probably five gestures throughout, yet these were somehow kept fresh with unique pacing and focused augmentation. Mr. Teruggi's piece portrayed a remarkable sense of space, with sounds appearing as close

as the nearest speaker, as far away as possible, and everywhere in between. In conjunction with this, *Birds* also contained the softest gestures in the concert, which forced the listener to engage with his music as it was swallowed by highway traffic (I rather enjoyed this, though my conversation with the composer after the concert led me to believe he did not). Though suffering from perhaps one too many false endings, *Birds* was an engagingly beautiful work with clear highs and powerful lows, and one that I was glad to hear in all its multi-channel glory.

Marc Battier's *Capital Bird* (no relation to the previous work) was the only piece to feature an instrument, in this case the Japanese shakuhachi flute. Mr. Battier was able to create some very fine granular textures out of a ninth-century Japanese poem, written by Ariwara no Narihira and read by Franck Royon Le Mée. These fit well with the shakuhachi's airy, noisy sound, and overall the piece had a pleasant arch to it.

François Bayle was certainly the drawing

François Bayle performs at the Chelsea Art Museum, November 14, 2008. Photo by Amy Eisinger.

point for the evening. As director of the GRM for over 25 years, and composer before and since, Bayle is a major figure in acousmatic music: so much so that he is the one to have coined the term. In the pre-concert talk, Dr. Bayle (honorary from University of Cologne in 2005) discussed his current work as an exploration of microworlds, an exploration of tiny sounds that can be exploded into larger forms. This became clear when *Univers nerveux, in memoriam Karlheinz Stockhausen* was played. This music was alive with detail. Bayle took the maximalist approach, directly the opposite of Teruggi's work, inundating the listener with a constantly changing collage of swoops, swirls, clouds, and drones. The sounds were beautifully engineered, but at the same time strikingly organic. Similar to Dhomont and Parmeggiani, Bayle seems able to construct an electronic gesture that is fully artificial, yet with a visceral quality reminiscent of physical action. Why only these pioneers of tape music seem able pull this off, I don't know, but like many electronic composers to follow these gentlemen, I would love to know their secret.

After the concert, I spoke with the three composers, and learned that François Bayle has just released a new book on the correlation of hearing and seeing, *Diabolus in Musica*, with text in French and English. I look forward to reading it.

I am also looking forward to the spring of 2010, when the HiFi festival brings Jonty Harrison to town for a concert featuring his music. However, while I find the prospects of an acousmatic scene in New York exciting, I wouldn't want it to take over as it has in much of the country. There are too many good things going on here in the realms of improvisation, installation, robotics, and experimentation. But if a city truly never sleeps, there should be time in the day for all kinds of music, and hopefully multi-channel tape music can be one of them.

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NYCEMF Review
April 2-4, 2009
Eileen Mack

After the miserable grayness of one of New York's April showers, it was a relief to step into the warm darkness of CUNY's Elebash Theater, if only to catch the last work of the afternoon's program. It was refreshing to hear an electronic piece, in this case Thomas Dempster's *contact clusters*, presented in such an acoustically resonant space. Samples of pizzicato and arco strings, used both on their own and processed, had such body that it seemed as if there might be a lone performer hiding in the blackness on stage. I returned the next day for a

session in the Segal Theater, a space that was somewhat less conducive to depth of sound.

Emmanuelle Weckerle's *A duet (virtually)* stood out from everything else on the program. It was the only interactive work I saw presented in concert, and it featured the composer on stage dressed to match her recorded image, projected on video. Her offstage colleague, Sebastian Lexer, interacted with the video by moving a cursor around the avatar's body parts, eliciting various gestures and vocal sounds. An interesting concept, this iteration of Weckerle's VINST project was disappointing and at times uncomfortable to watch. The graphics were somewhat low quality, the palette of sounds limited, and I was puzzled as to the nature of the interaction between the onscreen and live performer. The path of the cursor was predictable, starting at the head and heading inevitably down to a silver ball hanging from the nether regions of Weckerle's costume. The spectacle of virtual and live woman being manipulated by a shadowy male figure suggested philosophical questions beyond the ideas of Deleuze mentioned in the program note.

In contrast to this improvisational and puzzling duet, Mark Zanter's *s2* began in a harmonically coherent vein, making thematic use of simple chords and a sonic palette of organ- and bell-like synth sounds. It flirted occasionally with the line between electro-acoustic composition and new-age background music, fading out at the end into the roar of a passing subway train. Jay Batzner's *Carnival Daring-Do*, with accompanying film, replaced nebulousness with clear and detailed, if fantastic, imagery. The film was an animated, grayscale mixture of cinema pre-reel characters and optical floaters, trilobites and candy canes cavorting over monotonous plains. The soundtrack used appropriately skittish and small-scale sounds: chimes, woodblocks, and mysterious scrabbling.

Shatter, by Marc Aigner, opened with crescendoing blocks of various apocalyptic sounds, including breaking glass, industrial machinery, jackhammers and car crashes. What at first seemed like a series of stock action movie sound effects revealed itself to be a very clever juxtaposition of sounds exploring similarities and contrasts with often witty effect, as in a sequence including tinkling champagne glasses, gravel, and the sound of cereal in a bowl. This succession gradually morphed into more regular sounds like clapping, knocking and ticking. The piece wound down into an ambient wash complete with rushing water and chirping bird sounds – a quirky ending to such a collection of man-made sounds.

All the sounds used in Konstantinos Karathanasis' *De Ligno Chalybeque* were generated from cello samples, yielding a warm sonic palette suggesting wood drums, bells and flute as well as more obvious string sounds. A gentle beginning, with underlying synth, hum and air sounds, gave way to a more ominous and uneasy segment. Overall, this created an especially effective sound world, which was unfortunately punctured by a painfully swift raising of the lights at the end of the session.

The scheduled first work on the next program, Vera Ivanova's *Escape* for piano and electronics, was replaced by another piece by the composer for electronics alone entitled *Panic. Melancholy.* The dichotomy in the title was represented sonically in alternations between episodes of hectic cacophony and reiterations of a single pure tone. Later in the piece, processed vocals start to infiltrate these absolute concepts—shrieks, choral fragments, and sounds of angry crowds. An underlying interference-like pulse infused the whole work. Ms. Ivanova ran the board, perhaps a little over-enthusiastically, as there were several drawn out high frequencies that had even this audience (presumably accustomed to aural challenges) plugging their ears.

Arthur Gottschalk's *Contrary Variants* hearkened back to an earlier, Davidovsky-esque sound palette. The addition of a live performer (the excellent Jane Rigler, on flute) illustrated a recurring problem: that of aural position and balance between the single acoustic sound source and multiple speakers. Apart from this, the piece was well crafted and assured, though rather short, with clever interplay between the flute and tape. Pianist Juraj Kojs took the stage next and prepared for Jason Bolte's *Scrap Metal* by weighting down the sustain pedal and donning headphones. Here the piano timbres, including tapping and playing inside the piano, balanced well with the resonant metallic sounds of the electronics. The result was an adventurous exploration of timbral variation, with the piano only occasionally overwhelmed by the tape.

The appearance of a lone bassoonist on stage seemed potentially quixotic, but Peter Van Zandt Lane proved to be the hero of the program, eliciting whistles and a shouted "yeah!" from the audience by the end of his piece, *Aeromancer*. Running his own setup (laptop and interface) from the stage, Van Zandt Lane began with an angular atonal bassoon solo, soon joined by high open chords and burbles in the electronics. Some interesting pitch interactions between instrument and tape, and later a delay effect on certain pitches in the bassoon part, had me wondering how the electronics were tracking the live part – a question partially solved when

the soloist stood to take a bow, revealing a MIDI pedal at his feet. The piece ended satisfyingly with a fade back into sounds from the beginning, accompanied by sonorous romantic harmonies. This piece too suffered occasionally from timbral blend problems, which might have been solved with a little amplification of the bassoon.

Jean Ahn's slight piece *Berkeley Arirang*, apparently based on a Korean folk tune, again featured piano synced to the electronics via click-track. The tape seemed excessively soft, coming across as a processed echo or shadow of the instrumental part, which made interesting use of glissandi. It looked like violinist Spencer Topel began the following work, David A. Jaffe's *Impossible Animals*, before the engineer was quite ready, but an impressive scramble to open sound files and start the electronics seemingly saved the day. The piece mixed elegant melodies in the violin with synthesized vocal syllables. The violin often followed the pitch contours of the tape part, contrasting the beauty of the acoustic instrument with the slight awkwardness of the electronic voice. However, the climax of the piece turned the tables, presenting a rather astonishing and very impressive section in which a synthesized human voice followed the exact contours of the song of a wren.

Joshua Clausen's work saw the return of a be-headphoned Juraj Kojs, and though titled *she quietly enters and leaves the fray*, it began with some unfortunate click bleedthrough. The hip-hop beats of the tape part contrasted weirdly with the unamplified piano sound, while their rhythmic sophistication sat uneasily with the harmonically simple and rhythmically square piano riffs. The piece was more successful when the piano was used for a more chordal or minimalist texture. An already long concert was extended when composer-violinist Mark Zaki encountered difficulties with his setup in the final piece, *On Reflection*. The characteristic Apple reboot chord gleaned knowing and sympathetic chuckles from the audience. This piece used looping and delay to layer sumptuous violin laments to beautiful effect, although Zaki's demeanor suggested that things weren't quite as they were meant to be.

The last session I attended began with Monty Adkins introducing and lauding the facilities at the University of Huddersfield where he is on faculty, including a new 25-speaker venue. The pieces on this program occasionally erred on the side of exulting technical ability and innovation over compositional interest. Adkins' two works on the program, *Five Panels no. 1 and 5*, certainly showed a masterful use of the surround system. He used the full dynamic range

of the speakers, including sounds on the edge of audibility (an extreme of dynamic neglected in most other works). His soundscapes were smoothly and subtly blended and integrated, perhaps in reflection of the Rothko paintings that inspired this suite of works. The palette, including marimba, pizzicato and water drops over an ambient bed, held my interest throughout the first *Panel*, despite sometimes getting rather close to an Enya-like new-age sound. *Panel no. 5* ended the program, and was accompanied by video by Pamela Harling featuring shots of cracked mud and granular, lensed images. The video helped to delineate structure in what could otherwise have come off as an amorphous piece.

Pierre Alexandre Tremblay also had two works on the program, *Walk That Way. Tuesday, Turn* and *la cloche fêlée*. *Tuesday* featured accompanying video in a similar style to the Adkins, although no artist was credited. True to his fatalistic program note ("Inhale. Exhale. Repeat until life ceases"), Tremblay evoked mortality with the use of inescapable repetitive sounds, often in polyrhythms – ticking, shakers, Geiger counters. The video synced perfectly to the music in several rhythmic sections, and featured fitting visuals suggesting fleeting schools of fish, ominous silhouettes, explosions, and finally what could have been a blurred human face. The end of the piece saw the intrusion of birdsong, alluding perhaps to the inescapability of Nature? *La cloche fêlée* was similarly philosophical. Based on a poem by Baudelaire (in English, *The Broken Clock*), it used more ticking as well as a climactic tree fall and tolling bell to evoke its inspiration's darkness. Michael Clarke's *Tim(br)e II* rounded out the program. All of the sounds in this work were derived from an oboe sample, which peeked out in its original form at the end, after a long crescendo and final flourish. CUNY and the Festival organizers are to be congratulated; the music presented showed a wide range of current activity in the field, and the sound technicians and stage crew were consistently excellent.

Book Reviews

Emmerson, Simon. *Living Electronic Music.*

Ashgate Publishing, 2007 (195 p., ISBN 0754655482)

Reviewed by Valérie Vivancos

Simon Emmerson's book *Living Electronic Music* seems to be drawing a rhizomatic topology of the elements that play a significant part in defining the live performance of electronic music today. The tone of the essay is alternately academic, scientific and journalistic, and the plural topics tackled in its six main chapters and numerous subsections overlap so as to achieve a quasi-exhaustive exploration of the subject. It is, however, important to note that Emmerson's perspective is deeply rooted in the acousmatic genre, a trait presumably induced by his teaching "Music, Technology and Innovation" at De Montfort University and his practice as an electroacoustic composer. Thus, references to acousmatic music, its technical analysis (studio composition, live diffusion, spatialisation and loudspeaker interface) and its pioneers and current practitioners (Schaeffer, Smalley) play a central part in his stance.

Drawing from the fields of research, observation and experience, Emmerson attempts to identify the acoustic, psychological and organic elements as well as the paradoxes and intricacies of live performances in the "electronic age." The notions of body, compositional intention, presence, immersion and degrees of spatial proximity are all carefully examined through the prism of non-chronological historical revolutions (rather than evolutions) and aesthetic theories often borrowed from visual arts paradigms.

Emmerson's analysis of the compositional process (prior to a "live" diffusion or improvisation) is toying with the "disappearance of the author" central to 20th-century avant-gardes. This is conducted through various automated electronic devices, but also through conceptual, systematic, and generative processes, scientific models and random productions including Cage's experiments, serialism and *elektronische Musik*. Subsequently, it also acknowledges the return of the personal print of the composer through the likes of anecdote and narration (Ferrari).

An important part of the book is then granted to the body as a sounding element. Live events imply the presence of "a human" coupled with an operation

of "spontaneous creativity" in a non-mechanical way that also involves the audience as a receptive component within the performative area. Emmerson shifts from the quasi-static experience of an acousmatic diffusion (of a piece that has been composed in the studio-instrument) to the micro-gestures of a laptop performer that still catch the audience's attentive gaze. A third category includes the moving body immersed in the Dionysian (almost taboo) rhythms of electronic dance music and its fleeting IDM trend. In this instance, references are made to Aphex Twin and a few like-minded contemporaries as accepted illustrations of the popular "electronica" genre of the 90s. There, Emmerson interestingly forecasts that "[i]n times to come there may be increasing exchange between electronica and 'academic' electronic music strains but aims and ideas can remain different without mutual distrust" (87).

The final chapters of *Living Electronic Music* are devoted to more literal acoustic preoccupations of the various scales of the performing space, approaches to multi-channel sound projection, new interfaces, and recording and amplifying devices—issues that can be of more specific interest to technically curious learners and practising performers.

Nick Collins and Julio d'Escriván, eds. The Cambridge Companion to Electronic Music.

Hardcover, December 2007, ISBN 978-0-521-86861-7, 312 pages, illustrated, notes, index; Cambridge University Press, The Edinburgh Building, Cambridge CB2 8RU, UK; telephone in USA (800) 872-7423; electronic mail orders@cambridge.org; World Wide Web www.cambridge.org

Reviewed by Michael Barnhart

(Editor's Note: This review also appears in the Fall 2009 issue (Vol. 33, No. 3) of Computer Music Journal.)

This book is a recent addition to the popular and extensive Cambridge Companion series. In the introduction, the editors propose to "deliver access to a powerful territory of inspiration and excitement" (p. 2), and deliver it they do. This survey deftly escapes the common pitfall of some similarly aimed works which, though bursting with fascinating facts about historical electronic music, ultimately fail to illustrate the aims that inspired such efforts in a way that meaningfully connects them to areas of current creative effort. Rather than simply serving up the history, this book invites and assumes participation and offers a diverse range of perspectives for

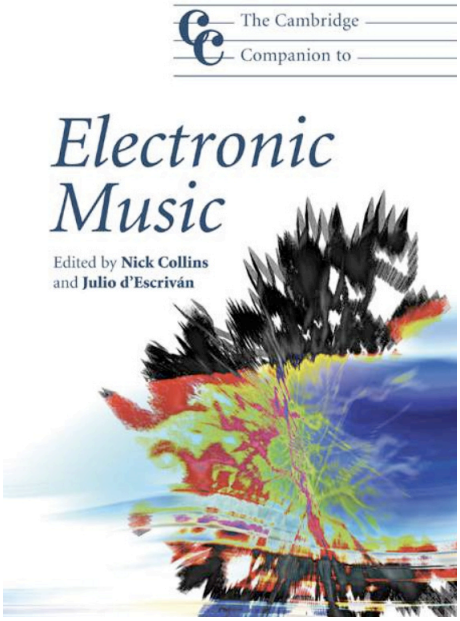
consideration. Restating content found in other familiar works is largely avoided in favor of presenting new ways of thinking about both past and present endeavor and "less widely represented themes from the research front" (p. 2).

The structure of *The Cambridge Companion to Electronic Music* consists of an Introduction followed by thirteen chapters grouped around three major thematic areas.

Part One, *Electronic Music in Context*, contains four chapters. In the first, entitled "The origins of electronic music," Andrew Hugill finds the nascent stirrings of desire for sound technology in passages of visionary fiction from the 17th through 19th centuries. It is a refreshing vantage point from which to begin. Taken together with his discussion of early inventions and their transformation into new expressive media, he illustrates the emergence of real sonic art from the collective imagination.

In Chapter Two, "Electronic music and the studio," Margaret Schedel looks at the importance of the early studio to aesthetic development and the changing definition of the studio concept. "The studio is no longer defined by its contents; rather it has become a context created by the user" (p. 37).

Nicolas Collins examines the development



of "Live electronic music" in the third chapter, acknowledging the important experiments of 20th century composer-performers and smartly including often-neglected subjects such as turntablism and circuit bending.

Ge Wang's "A history of programming and music" concludes Part One. He addresses pre-computer mechanical automation, the development of early computer music languages, contemporary real-time systems and future directions, looking at how "the programming language acts as a mediator between human intention and the corresponding bits and instructions that make sense to a computer" (p. 55).

Interleaved with the three major subject areas are two engaging collections of artists' statements following Chapters Four and Ten. Together, they offer a sampling of the creative perspectives of thirty electronic musicians from across a wide array of experiences.

This excerpt by Alejandro Viñao offers a glimpse:

> Our serious music world has disowned one of its greatest traditions: that of being at the forefront of technological transformation in music. Far from inspiring change and invention like composers of the past, most composers of the last sixty or seventy years have attempted to create the music of today with the technology of another time (p. 187).

So does this one by Seong-Ah Shin:

> Most students called the studio the 'ghost room' because of the strange sounds that emanated from that dark corner of the building. However, for me it was the most interesting room in the department, with new sounds and fascinating equipment (p. 82).

Part Two, *Electronic Music in Practice*, is comprised of six chapters (Chapters 5-10), each dipping into a different conceptual stream of contemporary work. "Interactivity and live computer music" by Sergi Jordà covers the computer as instrument and the composer as instrument builder, and catalogs various means of performance interface and their inherent possibilities/limitations.

Karlheinz Essl's "Algorithmic composition" presents a useful overview of the field, linking pre-computer process musics that involved style rules, serialism and chance operations to ongoing real-time experimentation. Chapter 7, "Live audiovisuals," co-authored by Amy Alexander and Nick Collins, examines the complex history of multimedia performance.
Julian Rohruber's chapter on "Network music" "covers a broad range from collaborative composition environments to sound installations and improvised music ensembles," giving special attention to the history and significance of communications technology in art (p. 140).

Julio d'Escriván's chapter, "Sound and the moving image," addresses electronic music for film, television and video games. Among other points of interest, it contains a favorable reappraisal of the importance of Raymond Scott's innovative commercial music and studio techniques during the 1950s and 60s and

closes with a provocative section entitled "Future media?" The final chapter of Part Two is Nick Collins' "Musical robots and listening machines." A subsection entitled "Four interactive improvisation systems" gives detailed profiles of selected composers' strategies. Other subsections include material on machine listening and accompaniment.

Part Three, *Analysis and Synthesis*, contains three chapters. In the first, "Computer generation and manipulation of sounds," Stefania Serafin provides a well-organized overview of the categories of synthesis techniques and their origins, ending with an exploration of future possibilities. In the second, Petri Toiviainen reviews "The psychology of electronic music," explaining "some of the important aspects of perception and cognition that can be regarded as useful for gaining better understanding of the perception of electronic music" (p. 231).

Natasha Barrett's substantial finale entitled "Trends in electroacoustic music" "identifies these trends and their compositional and aesthetic circumstances, forming a springboard for a new composer to the genre" (p. 232). The main text is preceded by a detailed timeline (beginning with Pythagoras and ending with contemporary video games) that highlights many foundational contributions to and developments in electronic music. Curious readers will welcome the selected discographies and suggestions for further reading that follow many of the chapters, as well as additional notes and a lengthy reference list.

The diversity of topics, accessible format, careful referencing, and the high quality of the contributions to *The Cambridge Companion to Electronic Music* guarantee that it will be of some interest to nearly every reader of *Array*.

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