Reviews

Events

ICMC '99

International Computer Music Conference, Beijing, China, 22–28 October 1999

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The International Computer Music Conference was held in Beijing, China, a bustling city with its feet in the 15th century while reaching toward the 21st. Scant weeks before ICMC '99, Beijing had finished a "refurbishing" to celebrate the 50th anniversary of the People's Republic, so the city was in fine form to receive the computer music delegation. Even though it was sometimes hard to tell just by looking around, China still considers itself a developing nation (the first to host an ICMC). This occasion presented an unparalleled opportunity to showcase computer music to an audience unfamiliar with the medium. Apparently a large media contingent covered ICMC '99, including China Central Television (CCTV), China Education Television (CETV), and Beijing Television (BTV), which produced documentaries in addition to live broadcasts. China National Radio and Beijing Radio played music and interviews. Newspapers published articles, and periodicals such as *Time* magazine (Asia edition), *Cosmopolitan* (China edition), *China Daily*, *China Youth Daily*, *Beijing Youth Daily*, *Music Weekly*, and others contributed to focusing attention on the ICMC and computer music, with a potential audience in the tens of millions.

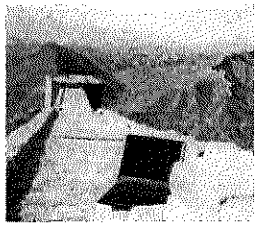
There were likewise many complications associated with holding the conference in a country still "under construction." People in the West tend to take infrastructure for granted—little things like dependable electricity, a drinkable water supply (and public restrooms with flush toilets). Luckily, while technical difficulties did occur, they did not predominate events. As far as we know, no delegates had any problems convincing customs officials of their harmlessness. Unfortunately, we found out later that the single commissioned installation—*Cross-Talk*—was delayed because of customs issues, and so wasn't active until nearly the end of the conference.

Beijing is a city full of interesting sights and wonderful food. Most delegates took at least one day off from the conference to go sightseeing, who could resist the lure of the Forbidden City, the Summer Palace, or the Temple of Heaven? From our first meal in China to the last, dining was an adventure. The handful of delegates who spoke Mandarin found themselves in high demand as dinner companions. One night without such assistance, we found ourselves confronted with a smiling waiter holding a netted live fish in one hand and two blinking frogs in the other! Sadly, we missed the official ICMC banquet, but surely the legend of the camel paws will be told in computer music circles for generations to come.

Most delegates stayed at the Beijing Friendship Hotel, an impressive multibuilding complex 15–45 min away from the university (depending on traffic). The Friendship housed several restaurants, two bars, a few little shops, and a business center with an agonizingly slow Internet connection and Microsoft Word in Chinese! There was a paid lunch plan at the university, but we chose to fend for ourselves. On the last day, we broke down and ate with everyone else on campus and it was a congenial atmosphere, conducive to meeting new people and renewing old friendships. While all of the papers can be read in the proceedings, and much of the music appreciated just as well on disc, there really is no substitute for the camaraderie of swapping stories with grizzled veterans and young punks alike, feeling the sense of community, of involvement, of collectively shaping the future of music.

Full credit for a smooth-running conference should be given to Josef Fung for the extraordinary feat of stepping in as conference chair relatively late in the planning process. The original conference chair, Professor Gong Zhenxiong, from the Department of Physics at Peking University, initially presented a hosting proposal in 1997, which the ICMA board accepted. In November of that year, he traveled to Japan in order to raise funds and open a dialogue with the many music-oriented corporations there. While in Tokyo, he fell seriously ill, to the point where he could not continue as conference chair, and Peking University felt it had no alternative but to withdraw from the project. This occurred in April 1998. Josef Fung was by then aware of the situation, and soon after decided he was willing to take it on. So, first we should thank Professor Gong Zhenxiong for initiating the process and turning our eyes toward Beijing, and wish him well on his way to recovery. Sadly, he was not able to attend the ICMC he originated. Second, we should all thank Josef Fung and his wife Chang Yan, for taking up the yoke and carrying ICMC '99 through to completion. Without their selflessness and stamina, there may have been no ICMC at all this year. If even half of the media exposure surrounding ICMC '99 hit its mark, the worldwide audience for computer music could well have doubled, and this year could become known as a watershed moment in our field. Regardless, it is certain that ICMC '99 will hold a special place in all our collective memories.

We hope we have given you a sense of the surroundings at ICMC '99—the simultaneous culture shock and delight made up a significant part of the conference experience. But to move on to the relative familiarity of the computer music world, things for the most part were business as usual.



Concerts

With the exception of a dance concert on 23 October, all concerts were held at the Tsinghua University Auditorium, a 20-min walk from the Tong Fang where the paper sessions were held. The auditorium itself was essentially a stone cube with a high domed roof, housing an eight-channel sound system with half of the speakers positioned in or on regular seats. These were not roped off in any way to prevent unwitting audience members from sitting too close, so some concert-goers were very surprised at the amount of sound in their vicinity.

Many International Computer Music Association (ICMA) members noted that this year's concerts received the most local interest they could remember. The area outside the concert hall was usually packed with bicycles, and the Chinese students in the audience almost always outnumbered the conferees. It was certainly a new experience to attend a concert with a mostly Chinese audience. People strolled in, sat down, stood up, and moved around without regard to beginnings or endings of pieces. Cellular phones and pagers went off regularly, and there was usually a large group in the back of the auditorium conversing in not-so-hushed tones. While initially quite distracting, we soon let go of our Western ideas of decorum and learned to ignore the environmental noise floor. Once in a while, a well-timed cell-phone ring or vocal outburst added a surprisingly effective aleatoric element to the music.

It was wonderful to see so much local interest in the ICMC. Television cameras were evident at all of the evening concerts, broadcasting computer music to over a million viewers and listeners. The dance concert, the only performance that wasn't free to the public, completely sold out, and people were actually scalping tickets on the street. This is definitely a situation future conference organizers should aspire to (though perhaps not the scalping).

Most days followed the same format of a tape concert at 1:00 PM and a themed concert at 8:00 PM. Themes included featured composers of instruments, dance, and multimedia. Unfortunately, the afternoon concerts were not well attended by delegates, in part because it was almost impossible to hear the late-morning paper session, eat lunch, and get to the afternoon concert on time. On the second day the schedule was even more hectic, with an extra concert at 5:00 PM featuring guitarist Norio Sato.

There were far fewer technical difficulties than most people expected. Only two of the interactive pieces at the conference had to be presented in tape form. Andrea Beckham danced to a video and tape of Russell Pinkston's lovely piece *All Round Me*, because the interactive dance floor and video tracking system were too difficult to ship. Ye Sung Lee's piece, *Der Wanderer*, was also played on tape, because it proved impossible to obtain a MIDI grand piano. Judith Shatin's interactive flute work, *Kairos*, suffered a few technical problems, but was moving despite some unwanted distortion. Luckily, her piece was selected for the official conference CD, so we can hear how an ideal performance might have sounded. Interactive pieces continue to be the most challenging to perform and produce, so it's gratifying to see that both of next year's ICMA-commissioned works will involve interactive elements.

We were dismayed that three of the live instrument-and-tape pieces were presented by playing recordings of live performances. The pieces were not nearly as effective as they could have been; the intimacy of the performer and his or her instrument combining with the tape was lost. Should pieces be pulled from the program if they can't be performed properly? Whose decision should it be? Many other composers were concerned at this turn of events, but no one had a definitive solution.

The most significant criticism with the concerts concerned general organization. Most had at least one order change, but they were not written anywhere and were only announced (none too loudly) at the beginning. This was a particular problem with the afternoon tape concerts: there were no visual cues to

help the audience distinguish between pieces, most composers were absent so we couldn't peek to see who was running the console, and of course the program notes often bear only remotely on the music. Would it have been so terrible to announce the composer and name of the work before each piece, or at the very least post a revised program in the lobby for reference? Even so, by far the worst snafu happened the night of the dance concert. On every printed schedule we had been given, the event was listed as starting at 8:00 PM, but when we arrived on time, the concert had actually begun 45 minutes earlier. Ironically, we had received our tickets the very first day of the conference and on the back was stamped "715," but somehow no one made the connection, and there was never any mention made of the time change. The concert itself was amazing, and everyone who came late was sorely disappointed they had helplessly missed the entire first half. Not only that, but we had also defaulted our assigned seats, so we all had to watch from the very back of the upper-level balcony, barely able to see the stage.

The Beijing Modern Dance Company did an incredible job choreographing and dancing to computer music. Josef Fung and Vincent Gagnon's work, *Blood*, was especially effective, with at least 25 dancers in red bodysuits rolling, crawling, and propelling themselves fluidly across the stage. The choreography itself almost seemed granular, with the dancers demonstrating independently general tendencies, but no specific interrelation until at one point they converged to form a beating heart. Other imaginative choreography included a trio with a man, woman, and newspaper, and extra dancers that appeared for only seconds each within a 10-min piece. While the use of the fog machine was a bit excessive, the performance was consistently engaging, both visually and aurally. We've heard it said that for dance, the best the music can hope for is to "not get in the way." In this concert, the music rose well above that standard, embracing, enhancing, and intensifying the choreography. But to be fair, the night truly belonged to the dancers, who were nothing short of stunning throughout.

The only other concert that came close to matching the visual magnificence of the dance spectacle was the final night's multimedia concert. Joseph "Butch" Rovan's *Continuities I* was a triumph of combining art and technology. Mr. Rovan used a stylish, cyber-looking glove controller to trigger samples of a short poem by Archie R. Ammons. While some concert-goers were disturbed by the blatant appearance of the glove, we enjoyed the contrast of a stark technological device producing rich musical textures. The six "scenes" of the piece were each internally cohesive, and the entire work took the audience on a journey from the concrete to the abstract, demonstrating a rewarding sense of multilayered structure. *Curve Air 4*, by Kazuo Uehara, was fascinating to watch as the composer set multiple pendulums in motion then sat at the computer to manipulate the data, weaving cosmic video imagery with the sound.

Reflets/Vitesse, by Todor Todoroff, featured an almost comical black-and-white video of a fast ride through the city of Paris shot in 1925. The music matched the video in its unceasing drive to the end. Joseph Hyde's *Zoetrope*, relocated from an earlier concert, seemed to be a tremendously unusual montage of images and static, interlaced so as to be nearly indistinguishable. We thought the visuals, halfway between apprehension and discontinuity, consciousness and dream, powerfully reflected the musical score. Imagine our surprise when the credits came up and were still distorted; we heard rumors later that the whole video had undergone some strange NTSC format-translation error. We were unable to confirm whether or not this was the case. Unfortunately, one of the works we had most looked forward to, *Pacific Dragon*, by Barry Truax, was not shown.

As always, the evening concerts were the highlight of the conference, but this year's afternoon concerts were particularly disappointing. Many composers felt the long trip to China was not worth the expense and travel time. As the week progressed, afternoon concerts had smaller and smaller audiences. While Kenneth Fields and Vincent Gagnon did admirable jobs standing in at the console, they could not know the pieces as well as the composers. It was obvious when the composer was actually running the board, even though some were a little confused at first by the fancy digital Mackie hardware. Paul Koonce spent an entire hour equalizing his piece beforehand so it would sound just right in the hall, and it made a big difference in the performance. His *Breath and the Machine* was an ICMA commission, and was one of the most successful tape pieces delivered. He used the single concept of the struggle between body and machine to produce a many-layered, timbrally complex work that rewarded attentive listening with evident form, echoing perhaps the eternal tension and release of breathing.

Apparently the jet lag, lousy air quality, unusual diet, and foreign microbes took their toll on both of us, as we missed the keynote concert where the other commissioned work, Ambrose Field's *Expanse Hotel*, was premiered. The prevailing opinion, however, seemed to be that the Chinese virtuosi were not given material that truly enabled their talent to shine. This circumstance happens too often, in which works for special instruments or ensembles are requested on short notice, and composers don't have enough time to learn the intricacies of the new resources at their disposal. But of course the elusiveness of artistic perfection is a poor excuse not to try, so kudos all round to the composers and performers who struggled with all the unfamiliar challenges and daunting opportunities presented to them by the Chinese milieu. With the exposure that computer music received this year, there should be droves of new ICMA members from China. They will surely take the integration of the avant-garde and the traditional to a new level, along with searching out more common ground between Eastern and Western musical cultures. Baby steps so far, but what an auspicious beginning.

Papers, Posters, and Demos

The papers, posters, and demos at ICMC '99 for the most part reflected the usual diet of steady progress, practical development, and incremental refinement. Synthesis techniques, interactive systems, compositional assistants, audio manipulation software, analytical perspectives, and network-oriented communications tools were all well represented on the menu, along with a few side dishes of musicology, artificial intelligence, and the occasional morsel that defied categorization. For better or worse, it was simply impossible to digest it all—sessions overlapped one another to such an extent that even dedicated connoisseurs had to pick and choose which items to try. On the other hand, so many courses meant there was plenty to satisfy even the heartiest appetite. Rather than attempt to consume everything, we decided to sample a wide variety of the rich assemblage of appetizers, entrees, and aperitifs presented in the hopes of identifying some predominant spices and distilling the essence of this year's cuisine for those who preferred to dine at home.

For various reasons, the ICMC no longer seems to be the event where major developments in the field of computer music are announced anymore. Because of the Internet, everyone is aware of important happenings long before the conference convenes. As a result, there is no overall buzz of anticipation, and not much to ignite the entire community's interest. Of course, there are plenty of significant and fascinating projects going on in various niches, and the proceedings are packed with valuable information if you are willing to dig for it. And perhaps it isn't appropriate for an academic conference to generate the same kind of hype as an AES (Audio Engineering Society) or SIGGRAPH (Association for Computing Machinery's Special Interest Group on Computer Graphics and Interactive Techniques) or NAMM (National Association of Music Merchants), but wouldn't it be fun to have something revelatory to look forward to every year?

The closest we came to such a watershed moment was the declaration that jMax, IRCAM's interactive platform of the future, has been released as fully open-source software under the GNU public license. Although IRCAM is surely hoping to hook users on the platform in expectation of selling supplemental add-ons, it was still a beautiful gesture.

The jMax announcement underscored a common theme: source-code availability is becoming the norm in our field once again. Dozens of projects presented this year have made source-code available online, including the Synthesis ToolKit (STK) of Perry Cook and Gary Scavone, CNMAT's (Center for New Music and Audio Technologies) Sound Description Interchange Format (SDIF), Grame's MIDIShare, InSpect/ReSpect from Sylvain Marchand and Robert Strandh, Common Lisp Music from Fernando Lopez-Lezcano and Juan Pampin, the Sound Processing Kit by Kai Lassfolk, and the venerable RTcmix originally by Paul Lansky, as well as most of the extensions to RTcmix such as Patchmix from Mara Helmuth. In addition, many projects that are not open source themselves have refocused their primary development from some proprietary platform to Linux, promoting at least independence from closed operating systems and even from hardware, to some extent. Dave Topper from the University of Virginia explicitly discussed the open-source phenomenon in computer music, and offered compelling arguments in its favor. The greatest advantage is not so much the price—open source does not necessarily mean "free"—but rather the potential for distributed development, improved cross-platform compatibility, and the building of peer-support communities rather than reliance on authoritative, unresponsive vendors.

We are all aware of how quickly precious years of investment in mastering software can be endangered when its fate is controlled by corporate interests. Perhaps we are finally seeing the reversal of a trend toward protectionism begun in the Chowning years, and the dawning of a new era of free trade. No doubt the market for electronic music tools

will continue to expand in size and profitability, but if this growing openness continues, it can only lead to more rapid transfer of new techniques from the lab into the hands of composers and performers, and isn't that really the point? As an aside, one frustrating aspect of collaborating as an on-line community is URL decay; several papers published links to project information and software that had vanished by the time the conference rolled around, and no search engine could track them down. Obviously, in order to fully participate in the computer music community today, it's crucial to have a findable and functional on-line presence.

All of the papers, posters, and demos were presented on the third floor of the Tsinghua University Tong Fang, the Science and Technology Building. There was one large and one small paper room, with posters in the hallway outside and demos sharing space with the lounge. The arrangement made it easy to flit from one thing to another, but it often got hectically crowded, and the marble hallway reverberated with competing posters and passersby. There always seemed to be enough seating, and rarely was it difficult to hear or see a presentation. The large room had a particularly nice screen-projection system, and many people took advantage of it with some fine PowerPoint slides. In fact, the number of laptops around was astonishing. Clearly, no one was taking any chances on what equipment might be available, though the resources provided by the conference turned out to be considerable. The resident stable of iMacs went mostly unused, but the LCD projectors handled every platform, resolution, and refresh rate under the sun with nary a hiccup, and nothing seemed to break down seriously until a few cable problems on the very last day.

The 1999 Swets and Zeitlinger Distinguished Paper Award was actually one of the standout presentations of the conference. Who knows why they scheduled it in the smaller room, but it was packed to standing room only. Dan Trueman delivered a passionate description of BoSSA: the deconstructed violin reconstructed. BoSSA (Bowed-Sensor-Speaker-Array) is a new instrument designed by Mr. Trueman and Perry Cook, from the music and computer science departments of Princeton University, respectively. This instrument "includes elements of both the violin's physical performance interface and its spatial filtering audio diffuser, yet eliminates both the resonating body and the strings." The components of BoSSA are the R-Bow, the Fangerbored, the Bonge, and the Critter. Despite the cute names, these are sophisticated, sensor-laden functional analogues of the traditional bow, fingerboard, strings, and body, though they fit together a little differently. The R-Bow gives four streams of data (two force-sensing resistors and a biaxial accelerometer relaying angle and rotation), the Fangerbored yields seven independent streams (one left-hand linear position sensor—a single "string," four FSRs beneath the fingers of the right hand, and another dual-axis accelerometer), and the Bonge provides four data streams (corresponding to four "bowable" sponges resting on fixed FSRs). Because most performers have only two hands, not all dimensions of data are simultaneously available, but since every stream can be mapped independently, the possibilities for generating sustained sounds with one controller and then manipulating them with another are obvious. The final component is the Critter, a basketball-sized spherical array of twelve loudspeakers (mounted in a dodecahedral configuration) that can radiate sound equally in all directions. Mr. Cook and Mr. Trueman used principles from their NBody project, which essentially models the radiative impulse response of various acoustic instruments to reproduce arbitrary resonance models on the Critter. Basically, the BoSSA can mimic the resonant qualities of a violin, a cello, a guitar, or any other instrument whose impulse response can be measured.

Technical details aside, the BoSSA seems to be a flexible and sensitive instrument that takes advantage of traditional violin skills while opening up possibilities for interactive real-time performance far beyond the basic pitch-tracking commonly used. Of course, so much depends on the mapping, and we were treated to, or perhaps teased with, a brief segment of the first piece written specifically for the instrument, *Lobster Quadrille*. Unfortunately, there was no demonstration of the BoSSA at ICMC '99; we hope there will be one ready for ICMC 2000 in Berlin.

It is, of course, impossible to do justice to the 161 papers, posters, and demos presented at ICMC '99, so we will restrict ourselves to a few words of other items of note.

Both by technical merit and marketing blitz, SDIF, introduced a couple of years ago by CNMAT, seems to be gaining momentum. Originally an "interchange format for spectral descriptions of sound," it is being positioned as an open standard for describing audio at the abstraction level. As a format, it has more in common with Csound scores and orchestras than a sample-level bit-stream format such as AIFF (Audio Interchange File Format). It is conceptually similar to the Structured Audio Orchestra Language (SAOL) format included in the MPEG-4 specification, and one of the papers detailed how data can be cross-coded between SDIF and SAOL in order to use MPEG-4 devices as "synthesis engines" for audio output. Objects for working with SDIF in Max/MSP were also presented. CNMAT, IRCAM, Xavier Serra, and others have formed a loose consortium committed to using and promoting SDIF, and as tools continue to be developed and made available, it looks to become a very useful standard.

In "Learning Models for Interactive Melodic Improvisation," Belinda Thom from Carnegie-Mellon described her work toward enabling a computer to improvise interactively with a performer—listening to what is being played and incorporating that back into its own output—in an attempt to simulate the "handing-off" of material common to jazz and blues improvisation. So far, it is only in the development stage, but her work already demonstrates real potential for creating an autonomous partner with a musically sensitive "ear."

Xavier Serra demonstrated The Musician's Software Mall, a suite of applications for working with the technique of spectral modeling synthesis. SmsTools analyzes soundfiles, SmsPerformer provides a graphical interface for real-time synthesis, Music Maker (formerly SmsComposer) aids in composing, generating, editing, and synthesizing score files, and Drizzle (formerly Vocem) presents a graphical interface for real-time granular synthesis. The demonstration, on the Win32 platform, consisted mostly of manipulating audio in real time using various graphical user interfaces to control synthesis transformation and filtering. The applications also accept MIDI messages for parameter control. The interfaces looked well designed and responsive, if a little crowded. As with any software of this type, trying to make live music by dragging widgets with a mouse is tricky, but connecting more natural controllers to real-time SMS processing would be exciting. As the authors admit, "SMS has, for some time now, been developed and researched with few applications to composition and performance," so fortunately it looks like this shortcoming is finally being rectified.

At the very end of the conference, the annual ICMA members' meeting was held, to a notable absence of fanfare. Perhaps one-tenth of the delegation attended, not even filling the smaller paper room. On the agenda were the usual announcements of personnel changes, financial reports, and plans for the future. Mary Simoni was officially designated the incoming ICMA president. A new ICMA logo, in its third and final incarnation, was unveiled to a decidedly lukewarm reception. There were the usual grumblings about the paper and music selection processes and how they promote the acceptance of more conservative material rather than the most interesting or innovative submissions. We happen to agree that the results, particularly in the area of tape music, do not adequately reflect the spectrum of compositions out there, and the board seemed to understand that there are significant flaws in the current selection system. They encouraged members to offer input and suggestions and to get involved in exchanging ideas with the board. A thread that ran throughout was the anticipation that a new ICMA Web site, to be unveiled at an unspecified date, would facilitate dramatically increased member participation and board responsiveness by providing forums for discussions, areas for downloading music, and other enhanced on-line resources.

Installation

Since the commissioned installation did not go live until the next-to-last day of the conference, it's doubtful many delegates got a chance to make the trip downtown to the China World Trade Shopping Mall to experience it. After being delayed so long in customs and then needing to get a higher-wattage power circuit installed, it was a real victory to get it operating at all. Sculptor Carolyn Healy and electronic sound artist John Phillips, veteran collaborators on computer music installations, set up shop in a 12 x 15-foot concrete-walled room with exposed ductwork in the ceiling. From outside, strains of American pop music drifted up from the ice-skating rink downstairs. Inside, a handful of different stations were all driven by a PowerBook G3 in the corner running Max/MSP. Stepping through the door, one instantly departed the mall atmosphere for something more futuristic and unfinished. Translucent plastic tubing embedded with lights spiraled around the floor in an eerie glow. A giant inverted stainless-steel funnel salvaged from a soup factory demanded to be struck by a felt mallet hanging from its lip, reverberating through the space and triggering a tiny black-and-white television set at the neck of a nearby upturned funnel to display images and static. Two tall, square Shoji screens lit from the inside flickered on and off intermittently. Adorning the screens were historical ham radio calling cards from around the world—fascinating designs in muted colors seamlessly collaged together. A bucket of black-and-white Styrofoam balls sat next

to a large rectangular dish of water ominously lit by a single white overhead lamp. Tossing in a ball set off different kinds of cacophony, from wild laughter to cymbal crashes to scraps of overheard conversation. In the background, a low, subtly undulating FM riff gave the aural sensation of floating underwater.

The installation was specifically commissioned by the ICMA with children in mind, and the artists created an environment that appealed to young and old. The audience seemed to be mostly Chinese children and their parents. Most kids spent a few minutes playing around, whacking the funnel, peering at the TV, and throwing balls until the bucket was empty, while the adults offered encouragement. It might have been nice to incorporate more overtly musical content, and maybe give the audio greater mobility within the space to create more of a sense of immersion and wonder, and the lighting could have been more colorful. But as with so many things at ICMC '99, the fact that it worked at all was cause for congratulations, and the innocent Chinese audience, for whom it was intended, obviously thought it was pretty cool.

Finally, on the last day everyone went to see the Great Wall at Simatai. Words cannot describe the awesome ambition and hubris of those responsible for such a structure. Not only is it 4,500 miles long, but the section we saw is built on top of some of the craggiest precipices imaginable. On the way up to the ridge, torn by bitter cold winds sweeping across the exposed steppes, we thought of how absurdly harsh it must have been to build this monument 22 centuries ago. With sweeping vistas of mountains receding in every direction, it was the perfect counterpoint to the congestion of Beijing, and we all gained a profound respect for the will and determination of the Chinese culture to achieve something so clearly impossible. It was also the perfect way to end the conference, leaving the delegates with a sense of inspiration to contemplate on the long flight home.

Conclusion

For us, ICMC '99 was the occasion for our first trip to Asia. If it had been held in Kansas, we would have spent a lot more time talking about research and pieces, and little time on cows and cornfields. But as we said earlier, this conference was really about Beijing, about China, and about reaching out to a people eager to engage this unknown field of computer music. If anything, the conference itself seemed a little stuffy and staid in comparison to its environs—this could be even more true in Berlin, a city also in the process of reinventing itself. So if we could recommend one thought to take away from ICMC '99, let it be this: keep aspiring to pursue computer music with the same dynamism, richness, and passion that makes Beijing so intensely alive, because that's why we're here. We would like to thank the ICMC for bringing us together as a community and reminding us that we share the same dreams. And, thank you, China!

Interactive Arts Festival

Columbia University, New York, New York, USA, 6–9 April 1999

The 1999 Columbia University Interactive Arts Festival was directed by Thanassis Rikakis and hosted by the Columbia University Computer Music Center. The event celebrated the opening of the new Interactive Arts Lab at the Computer Music Center by showcasing the music and technologies of an invited panel of guests, all prominent figures in the field of interactive computer music. In addition to a day of lectures and demonstrations held at Columbia's Prentis Hall, three concerts were presented before sold-out crowds at venues throughout New York City.

Movement and Sound, Merce Cunningham Dance Theater

Reviewed by David Birchfield
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In *Movement Study II*, Wayne Siegel employs the DIEM (Danish Institute of Electroacoustic Music) Digital Dance Suit, developed by Mr. Siegel and Jens Jacobsen, as an elegant and transparent interface between a solo dancer, Mata Sakka, and the computer processor. Resistance sensors are applied to each of the joints of the dancer, and this data is sent to a Max patch via wireless transmission, which then translates the dancer's movements into synthesized music. This direct interface affords the dancer total freedom of movement while allowing the computer to precisely document and utilize the choreography.

The work was divided into three sections. Slow, charged movements opened the piece, accompanied by droning pitches that were explicitly controlled by the opening and closing of the dancer's limbs. In the middle section, as Ms. Sakka's movements grew quick and precise, an energetic groove was triggered upon any movement, and was suddenly silent as her movement ceased. Mirroring the opening, a slow and expansive mood returned in the final section as low, foreboding pedal tones accompanied the compelling choreography. Mr. Siegel's music was direct and communicative, but his exclusive use of patches from a synthesizer module produced a stagnant sonic world. The expressive opening and closing sections would have benefited from the exploration of more subtle timbral differences.

Ms. Sakka, as choreographer and performer of this work, was clearly comfortable with the idiosyncrasies of the Dance Suit. She executed her choreography in a manner reflecting her apparent ease with the technological aspects of the piece, and demonstrated her intuitive sense of how even the most subtle details of her movements would translate into synthesized sound.

The second piece on the program, *Song for the Living/Dance for the Dead*, was a triple collaboration between composer Russell Pinkston, choreographer Mata Sakka, and video artist Anita Pantin. The music was comprised of speech and nature-sound samples, processed to varying degrees to produce a rich palette of clearly recognizable sounds contrasted with intriguingly distorted versions of the same materials. While in some passages the music was simply sequenced by Max, most often the music was controlled by the movements of an ensemble of eight dancers. To facilitate this interaction, the work utilized an interface system in two parts.

The main components of the interface were two MIDI Dance Floors, which are two large mats with pressure-sensitive triggers embedded along both sides. The floors interact with a Max patch, either triggering a sample or indicating the beginning of a new section. At the opening, two dancers entered the stage and worked their way down the floor, each step eliciting another sound. Later, two dancers alternately leaped on and off of the two dance floors, triggering contrasting "cool" and "hot" text and sounds.

During an extended, intensely rhythmic middle section, Mr. Pinkston utilized a second interface, the Very Nervous System (VNS) video tracking system which, by "watching" the dancers, enabled them to influence the music through the character of their movements. The camera's view was divided into two fields, and, driven by an energetic percussion sequence, the dancers' frenetic movements on either side of a divided field of vision triggered various sonic events which augmented the already dense texture.

While the use of the video tracking system was effective and unobtrusive, the two large MIDI Dance Floors created a significant obstacle for the choreographer and dancers. The obvious sequential relationship between a dancer's foot on the floor and the resulting sample playback created a predictable scenario.

Orizzonte degli eventi was composed by Marco Cardini, Leonello Tarabella, and Massimo Magrini, with additional technical coordination by Giuseppe Scapellato. It is divided into four sections which are dramatically distinct in their methods of interaction and in the resulting music and video. Nonetheless, the piece was unified through the use of wireless tracking devices developed at the Computing Center for the University of Pisa/National Council of Research (CNUCE/CNR) to explore the translation of hand movements into sound and video.

Mr. Tarabella performed the first section on the Virtual Piano, a tracking system that follows the movement of his hands above an imaginary keyboard. As the audience watched his hands dance up and down in the air, the Virtual Piano produced an impressively accurate piano-performance simulation. Next, the lights were extinguished except for one ultraviolet light to illuminate the white-gloved hands of Mr. Magrini. Sculpting broad lines and gestures in the open space, thin bars of light cascaded across a video screen accompanied by a terse, synthesized music.

Mr. Tarabella also performed with the Twin Towers, an instrument much like a Theremin. It produces synthesized and sampled sounds sympathetic to hand motions above the instrument by means of an infrared motion-tracking system. In the final section, Mr. Magrini again utilized his hand gestures to manipulate video and sound. This video tracking system followed the movements of his brightly painted hands, as the powerful but controlled gestures translated into a pulsing, emphatic music with colorful, richly textured streaks on the digital canvas.

Each of these interactive systems was a creative and viable means of using the hands to interactively sculpt sound and video. However, with a striking lack of thematic or gestural development and little formal interest, the music of *Orizzonte degli eventi* was far less sophisticated than the interactive systems used to create it.

Matthew Suttor's multimedia theater piece, *Sarrasine*, based on Balzac's work of the same title, is comprised of eight sections. The original work is set in the 1830s at a party in Paris, as two lovers discuss the tale of Sarrasine, a frightful old man. Though the narrative was difficult to discern from a first listening, the major themes of Mr. Suttor's new work were conveyed through a delightfully overwhelming barrage of sound and video, enhanced and enriched by the live performance of the composer himself. This collage, collected from across centuries, dispelled any notion of chronological time and geographical place, and challenged the audience to weigh the world of

Balzac with this new *Sarrasine*.

The sonic world of the opera was a blend of the recorded speech of Mr. Suttor's voice reading from Balzac's text, recorded and processed marimba, harpsichord, flutes, and other electroacoustic samples. Despite their disparate features and implications, the composer successfully forged a unique sound world that at once suggested the 18th century of Balzac as well as our own time. Though the composer remained mute throughout the performance, allowing the recorded music and text to speak for him, his reserved and precise performance complemented the active video.

The images on video are often taken from paintings from earlier times, including one recurring image of Botticelli's *The Birth of Venus*. Mr. Suttor at one point assumed the pose of Venus, and the striking resemblance was as provocative as it was amusing. At another moment, he stood such that a portion of the video was projected onto his body as well as onto the screen. In this union of the video and live performance, the screen contained video footage of his writing and drawing as prerecorded images were superimposed on the screen. As the audience watched the composer literally step in and out of the video, they were compelled to draw parallels and conclusions regarding the juxtaposition of the two distinct yet successfully merged worlds of Balzac's and Mr. Suttor's *Sarrasine*. The piece made use of two interactive systems developed at the Studio for Electronic Instrumental Music (STEIM) in Amsterdam: BigEye (video to MIDI) and Image/ine (real-time control of video processing). Mr. Suttor seamlessly integrated technology and live performance in a manner clearly driven by his artistic aims. Consequently, he has created a truly cohesive, engaging whole.

Multimedia Interactive Works, Miller Theater

Reviewed by Doug Geers
New York, New York, USA

Since three of the four works on the second program of the Columbia Interactive Arts Festival utilized real-time computer-generated video, a massive screen was stretched across the shallow stage, adding a cinematic aspect to the concert experience.

The first piece, *Lemma II*, began the evening with a kaleidoscopic, fascinating integration of technology, musicianship, and visual pyrotechnics. The work combined four live musicians with real-time computer processing of sound and complex computer-animated images. Of the four performers in the piece, two played at Miller Theatre (New York), while the other two were connected via an ISDN connection from Intel Corporation's Oregon headquarters. These long-distance performances usually strike me as gimmicky, but I was pleasantly surprised by this one. Not only did the performers communicate musically with each other from opposite sides of the continent, but aspects of the performances from both locations were analyzed in real time and used to control various facets of the piece such as instrumental timbre and the appearance and movement of computer-animated images.

The beginning of *Lemma II* served as a demonstration of how the musicians and computers interacted. The music began with drummer Steven Schick and pianist Anthony Davis (New York) trading single-note gestures with Vanessa Tomlinson and Scott Walton (Oregon). With each attack, a bright sphere of color burst and faded like fireworks on the massive video screen hanging above the performers in both locations. Each performer's note appeared on the screen as a unique color, and it was very clear that the size and "lifespan" of each burst was directly related to the loudness of the note's attack. From these initial fireworks, the piece grew more musically and visually interesting as it progressed, passing through a myriad of sonic and visual spaces, producing an incredibly satisfying multimedia *tour de force*. My only critique is that the sonic "places" visited didn't generally seem to vary as strikingly as the visual ones.

Lemma II was created by collaborators Vibeke Sorensen (visual artist), Rand Steiger (composer), researchers Miller Puckette and Mark Danks, and performers George Lewis, Steven Schick, Anthony Davis, Vanessa Tomlinson, Michael Dessen, Harry Castle, and Scott Walton. Mr. Puckette's PD software analyzed audio input and transformed this information into control data, which it then passed to computers in both performance locations. The control data was also used to manipulate 3-D graphic images using Mr. Danks's GEM software.

Given all its technical complexity, the joy of *Lemma II* was that in performance the technology performed well and contributed to the realization of the work in integral and artistic ways. I found it to be the most satisfying work of the entire festival, and consider it a significant achievement by its creators.

The second piece on the concert was *Ping Bang*, a work for MIBURI synthesizer suit, additional electronic sounds, video, and computer animation. The work is a collaboration between composer Saburo Hirano and video artist Shinsuke Ina, and was performed by Hanachi Otani.

In *Ping Bang*, the performer wears the MIBURI, described by the composer as "Yamaha's new wearable physical-modeling synthesizer." It consists of a specially designed suit laden with motion sensors, a small microphone, and two hand grips with multiple buttons on each. Information from the microphone, the performer's motions, and her button manipulations create all of the sounds, and can also affect the presentation of computer-animated images. This is managed as follows: first, the sensors and buttons output data which are mapped to physical-modeling synthesis parameters. This synthesized music constitutes the "solo" instrument of the performer herself. Meanwhile, the same output is also sent to a computer running Max, which generates "accompaniment" music using the GCM (Globally Coupled Map) algorithm. In addition, Max also generates computer-image display commands, which are relayed to a second computer that controls the graphics.

The result was a highly integrated multimedia piece in which Ms. Otani's body movements clearly affected the musical texture. Filters opened and closed as she lifted and lowered her arms, for instance. The music itself was quite rhythmic, and at times seemed to be sonically akin to the noisy textures of Nine Inch Nails: highly distorted screams from Ms. Otani sailed over blocks of harmony and percussive ostinati. The opening and first several minutes were quite intriguing, and I enjoyed *Ping Bang*'s direct, timbrally sharp approach. However, the piece seemed a bit long: the second half reached a plateau and then remained there.

The computer graphics of *Ping Bang* alternated among a small group of images, creating a strict focus that paralleled the regularity of the music's rhythms. The primary images were photos of a statue of the Buddha and an exploding atomic bomb. At first I thought this choice too obvious, but then I became interested in the minimalist approach to their manipulation. They were presented repeatedly, focusing on different sections of the images each time, with varying positions on the screen and different image-processing techniques. The shifting combinations were akin to the signal processing of the music.

Third on the concert was *I Am Dying*, an elegantly conceived work for amplified mandolin with signal processing and computer music on tape, composed by Brad Garton and performed by Terry Pender. The piece consists of a traditionally notated mandolin part accompanied by precomposed computer sounds and real-time signal processing by the RTCmix music synthesis/processing software package, written in large part by Mr. Garton himself.

The precomposed accompaniment consists of both abstract material and *concrète* sounds from New York City, recognizable in varying degrees. All of the synthetic musical elements were created using RTCmix to render abstract gestures from the raw material of the environmental sounds. In performance, as Mr. Pender played the mandolin, the software processed his performance in real time using a variety of delays and other effects.

Clear and immediately comprehensible, utterly without pretension, this piece was a seamless combination of traditional performance and new technology, creating an uncluttered, unified experience. After the full-throttle energy of the concert's first two pieces, this one provided an enjoyable respite.

The evening concluded with a quite experimental experience entitled *Coney Island*. It is a product of the Machine Child Ensemble (MCE), a group centered at the National Center for Supercomputing Applications in Illinois: Robin Bargar (concepts, engineering), Insook Choi (composer), Alex Betts (engineer), and Juhan Sonin (aesthetic engineer). The concept for this work is that it be something quite different from a traditional concert where the audience is completely passive. Instead, one member of MCE (in this case, Mr. Bargar) acts with the assistance of multiple audience members in a group exploration of a virtual environment of graphics and sound.

Technically, *Coney Island* presents the results of investigations into real-time virtual reality and how this may best be experienced as an integrated artistic work. Mr. Bargar, onstage, introduced the concept of the piece, and asked for audience volunteers, who then manned four MIDI drum sets distributed around the auditorium. Meanwhile, he took up a control wand which he used to guide the group through the *Coney Island* environment. This virtual world consisted of several scenes of dynamic activity, with varying degrees of abstraction from physical reality. Mr. Bargar controlled the general movement through the environment, though in each scene the volunteers could stimulate or alter the visual and sonic activity by means of their drum pads.

The computer sounds and graphics were output in real time by a network of five computers backstage. The heart of the computational system is ScoreGraph, an application designed to integrate multiple dynamic simulations with sound synthesis and 3-D graphical display under interactive performance. Unfortunately, MCE had some problems with their network, and as a result the piece suffered. Many of the graphics looked unfinished (wire frames only

or with no surface textures), and the audio portion of the piece would be more properly described as ambient sound design rather than composition. Moreover, the actions of the audience members seemed to influence the environment only in trivial ways, while Mr. Bargar's controller directed everything else—not an ideal form of interaction. While I was assured that it had worked much more successfully during its premiere performance, on this occasion, at least, *Coney Island* didn't quite live up to its intriguing ambitions.

Interactive Technologies in Jazz, Rock, and Improvisatory Works, The Kitchen

Reviewed by Johnathan Lee
New York, New York, USA

For the first work of the Jazz, Rock, and Improvised Music concert, Joshua Fried presented his *Radio Wonderland*. Before Mr. Fried entered the stage, the audience had the opportunity to ponder his sonic devices: the Musical Shoes, a collection of four shoes mounted upside-down on stands, used to trigger electronics when struck by drumsticks. Occasionally manipulating a mixer to control how the snippets of a portable radio's output were to be edited, Mr. Fried explored the sonic world of triggering and recombining these samples into a collage. The Musical Shoes then did their "dance of samples" as the composer hammered away with his drumsticks. The visual and dramatic element of watching him trigger his samples in such a visceral manner added to the juxtaposition of vocal and musical snippets.

The Freight Elevator Quartet, joined by video artist Mark McNamara, presented a fresh outlook on technology's influence on live performance, this time in the realm of beat-oriented electronica. Although heavily dependent on samples, the piece *The Revolution Will Be Streamed* also depended on the live coordination of the efforts of each performer. Rachael Finn's processed cello, Paul Feuer's keyboard sounds, and the results of R. Luke DuBois' real-time signal processing were mixed by Stephen Krieger, who also manipulated drum loops and other instruments.

The Freight Elevator Quartet takes advantage of the relationship between the exciting elements of a live performance and the sonic wizardry of real-time shaping and manipulation. Their performance distilled and blew apart ambient sounds, jungle and down-tempo beats, experimental sonic collages, and Mr. McNamara's video images. Along with references to the themes of exploration, technology, and humanity, the video engaged the audience directly: a video camera captured the audience as background for visual manipulation using Image/ine. This gave the audience the role-blurring experience of watching themselves taking part in the performance by watching the performance. With such a wide array of stimuli, the experience tested the sensory capabilities of the audience in a manner that was engaging, powerful, and thoroughly fresh.

Closing the first half of the evening, the group What Is It Like To Be A Bat? showcased their work *She Said—She Said, Can You Sing Sermonette with Me*. Composer-performers Kitty Brazelton, Dafna Naphtali, and Danny Tunick, using an expanded rock instrumentation of electric guitar and bass, keyboards, computer-triggered/manipulated samples, and drum kit, moved between episodes of different styles, relying on a succession of sharp contrasts as the main organizational device. High-voltage interruptions were followed by sections of gentle a cappella vocal combinations, a contrast made more jarring by the starkness of the transitions. Although highly structured, the work allowed the performers to draw from their own musical backgrounds and interests, making the eclectic stylistic changes seem natural and comfortable. This demonstrated the principle of "unity in diversity" that is emblematic of the information society of today's technological age.

Performed by the Terry Pender Virtual Orchestra, *enter,activity* consisted of Mr. Pender's guitar sounds manipulated and processed by three other participants. These actions were produced independently of the guitarist, the model for interaction being that of a freely organized conversation between the participants. Although the audience could see what Mr. Pender was doing, it was harder to discern what his companions were doing until the results came directly out of the sound system. Perhaps that was the point: the audience "encountered" the conversation as a wash of sounds with occasional outbursts that owed their element of surprise in part to the "virtual" nature of the experience. Brad Garton operated various real-time signal-processing techniques using RTCmix, while R. Luke Dubois worked with various Max/MSP signal-processing interfaces he has developed, and Doug Geers managed the use of rack-mounted effects processors.

For the initial part of the piece, the disparity between what was seen and heard was quite strong, since the "actual" guitar sounds are hidden among the swirling sonic environment emanating from the signal handlers. Erratic chirps and rumbles contrasted with the slowly evolving surroundings, while short, repetitive gestures acted as sonic signposts for the audience to refresh their ears. At the end, the visual and sonic aspects of the performance came together as the audience experienced "actual" guitar chords as Mr. Pender played them, accompanied by a subtle wash of harmonies.

In the next piece, the electroacoustic duo Interface featured live performers in conjunction with real-time signal processing and sample triggering via Max/MSP, along with live video projection. The free-flowing, improvisatory music focused on the dialogue between Curtis Bahn's double bass and Dan Trueman's electric violin. The digital audio setup made extensive use of various sensors on the instruments that interpreted changes in the instrument's physical orientation as control data for triggering and signal processing. The improvisation took an organic shape, beginning with a sparse musical texture whose droplets and rumbles behaved as a counterpoint to Nick Fortunato's processed video images of clouds. Both Mr. Bahn and Mr. Trueman made use of extended techniques, often drawing unusual natural sounds from their instruments. The texture thickened as extended, active sections of the piece used the electronics to accentuate the wild exertions of the performers, juxtaposed with ominous, processed video imagery. Ultimately, the pent-up energy generated by the instrumentalists' sonic expressionism dissipated to a passage of consonance and harmonicity.

Eve Beglarian and Kathleen Supove of Twisted Tutu closed the evening with a set of songs drawing heavily on the tradition of music theater. Ms. Beglarian's wide-ranging vocals were matched throughout by Ms. Supove's skillful keyboard accompaniment. The duo injected the atmosphere of each song with the possibilities made available through the use of keyboards, sequencers, and signal processors, allowing them to move easily back and forth from the stylistic worlds of jazz, lounge, synth pop, and electronic rock. Their songs were tightly composed, drawing on a blend of wit and self-conscious sentimentality. The performance combined a sense of lightness and familiarity with a stylish take on each of the genres the duo evoked.

Musica Scienza 1999

Centro di Ricerche Musicali, Rome, Italy, 1–2 June 1999

Reviewed by Simone Tarsitani
Rome, Italy

Musica Scienza is an international festival of music, art, and contemporary culture organized each year by Centro di Ricerche Musicali (CRM) of Rome. It consists of a series of concerts, conferences, sound-installation presentations, and multimedia events. The CRM was founded in Rome in 1988 by Michelangelo Lupone and Laura Bianchini. The two composers, wishing to promote research into the aesthetic, analytical, musicological, and scientific aspects of music, formed a team of musicians and scientists working on joint projects with the aim of developing complex advanced initiatives and demonstrating the potentialities of a context in which scientists and musicians could meet and cooperate.

The 1999 edition of Musica Scienza was held in Rome at the Accademia Filarmonica and the Auditorium of the Goethe-Institut. It was an eventful occasion, marking the 10th anniversary of the festival. As in the past, CRM aimed to present to a wider public the results of advanced research in the language of music and in computer technologies applied to music. Musicians, artists, and scientists from all over the world contribute to the knowledge and diffusion of research and artistic idioms far removed from those of the mass media. Communication and the disciplines that study modes of communication were in fact the thematic nucleus around which this year's festival was structured.

The central theme was the voice, the favored instrument of communication. *Parola versus suono* [Word versus sound], the title of the event, called attention to the symbolic value of the word, to the processes of its transformation into significance—into language—so as to then gain possession of the literary and theatrical dimensions where the word becomes poetic text.

The conference *Il Teatro dell 'Ascolto* (Theatrics of sound hearing) consisted of two meetings that dealt with the themes of creativity and the means for artistic communication. By analyzing the development of content in relation to the innovations of artistic communication, a balance was drawn up outlining the actual state of research into the technologies of the means of communication. A presentation by Derrick De Kerckhove led to a discussion on creation and communication. The full day of reports, opinions, and performances provided an in-depth examination of the evolution and prospects of the idioms in the light of artistic diffusion through radio, media, digital, and interactive channels.

The chief feature of the festival was without doubt the homage to Edgard Varèse, a memorable evening in three parts. The commemoration opened with *Il sogno di una macchina* (The dream of a machine), an imaginary dialogue between Mr. Varèse and Anaïs Nin written by Guido Barbieri and Sandro Cappelletto on the basis of an interview of Mr. Varèse by Ms. Nin.

This first part of the performance, acted by composer Sylvano Bussotti and Anna Maria Gherardi, was held at the Sala Casella with concentrated localized listening conditions using "planephones," special multiphonic sound-diffusion systems developed by Michelangelo Lupone at CRM and presented for the first time at the Musica Scienza festival of 1998. Planephones are vibrating sound systems consisting of panels of different materials (wood, metal, plastic, leather) and shapes installed in artistic venues, with them it is possible to design the acoustic space according to the architecture of the hall, and give the sound the timbral quality of the materials employed. This type of installation ensures accurate and detailed listening conditions, as the sound is not only diffused homogeneously along the vibrating surface of the panels, but is also localized, consequently, a hall of small dimensions is required where the public can be seated fairly close to the panels (2–3 m). The installation realized in the Sala Casella was designed by Giancarlo Gentilucci.

At the end of the imaginary dialogue, the public was invited to walk in the gardens along a highly suggestive path created (in collaboration with Gramma) by installing a number of waveguides, artfully positioned in a play of lights and materials in keeping with the natural environment of the gardens. This path led to a reconstruction of Le Corbusier's Philips Pavilion, where a reproduction of the event realized by Le Corbusier and Edgard Varèse for the Brussels Exhibition of 1958 was presented. It was a remarkable event, a unique opportunity to see, for the first time since 1958, a masterpiece that was likely the first genuine electronic multimedia performance in the history of music.

Le Corbusier decided that his design would not merely be a pavilion, but also a *Poème electronique*. The result was a revolutionary structure conceived as a space in which architectural, visual, and musical elements were continuously and consistently interlaced. Based on the idea of a bottle containing the *Poème electronique*, the structure was conceived with an unusual ground plan shaped like a stomach; that is, a wide central area with an entrance at one end and an exit at the other, a configuration well suited to the requirements of the pavilion, since it facilitated the continuous transit of visitors.

The public entered this mysterious space accompanied by the strains of *Concrète pH*, a prelude composed by Iannis Xenakis (the musician and architect who supervised the realization of Le Corbusier's design, although Mr. Xenakis has disputed the authorship of the pavilion). When sufficient people had entered the central area, they listened to a performance of Mr. Varèse's *Poème electronique*, lasting approximately 8 min, accompanied by lighting effects and projected images produced under Le Corbusier's direction. The allegory of the design in the form of a stomach, a place where matter flows through continuously and at the same time is modified, was used to symbolize the influence of the arts on humanity. The walls of this futuristic structure were shaped as hyperbolic paraboloids in order to fulfill multiple functions; not only were they suggestive elements of creative architecture, but they also served as screens for projecting the lighting effects and images, and were studded with loudspeakers to ensure refined sound spatialization.

The black-and-white images projected on the two sides of the "stomach" reviewed, with a very succinct and suggestive sequence of allegories and emotions, the history of human civilization from its origins to the present: a voyage from darkness to dawn, a catharsis that evolved in step with the triumph of reason through science, and culminated in a finale of harmony and optimistic hope. The last images of the film showed a group of children, symbolizing the birth of a new era, and an open hand, as a symbol of peace, while the narrator recited "Observe this open hand, the open hand raised as a token of reconciliation, open to receive and to give."

The plan for restoring and staging the *Poème electronique* was carried out jointly by Valerio Casali (a versatile architect who is well versed in music and highly knowledgeable of the work and philosophy of Le Corbusier) and by the artistic-scientific team of CRM. The task was lengthy and highly complex. The mighty reinforced-concrete structure of 1958 was scaled down, maintaining the original shape while erecting walls of cloth paneling. A splendid up-to-date reproduction of a starry sky was placed on the ceiling, replacing with optical fibers the lamps used at that time. Faithful copies of two symbolic objects—the mannequin and the mathematical object—were suspended in mid-air, metaphors of the conflict between nature and mathematics, between instinct and reason.

The original score of the multimedia event, which gave detailed instructions on the changes of lighting and atmosphere for each image and section of music, was scrupulously followed by Valerio Casali during his work. Laura Bianchini was responsible for the musical element. The original sound-spatialization schemes were emulated by diffusing the sound through 24 loudspeakers. As a result, it was possible once again to experience the splendid, astonishing creation of Le Corbusier and Mr. Varèse while being plunged into a complex space where sensory perceptions were multiplied by a crescendo of ideas, suggestions, and emotions. The passage through the "stomach" shook, thrilled, and changed us all.

On leaving the pavilion, the garden walk led to a new listening space among the trees where a performance of *Density 21.5* by flautist Silvia Lanzalone concluded this magnificent promenade.

These three different listening environments were maintained throughout the entire festival. For the succeeding concerts, the music was diffused in the Sala Casella by planephones, in the gardens by waveguides, and in the pavilion by the loudspeakers installed on the walls. In this way, the public could choose either to follow the concerts live or transfer to one of the outside venues for a different form of listening. These forms of multiple, sophisticated, and innovative listening were highly appreciated by the public, who had the opportunity of experiencing for themselves the value and importance of sound-diffusion systems in contemporary music.

One monographic concert was dedicated to Teo Usuelli, a composer who has long collaborated with the CRM team, and included the performance of electroacoustic and instrumental passages taken from the soundtracks of Marco Ferreri's films.

The concert of singer Silvia Schiavoni and the CIMA Choir was particularly noteworthy. They presented two world premieres: *Ni anverso, ni reverso*, by Andrea Nicoli, a musical journey that follows the suggestions and literary references of a poem by Luis Borges, and *...Il resto è quiete*, by Laura Bianchini, inspired by some of the most important of Shakespeare's tragedies.

Georg Hajdu: Der Sprung

Wirèworks Orchestra, Pumpenhaus Theater, Münster, Germany, 2–3 October 1999

Reviewed by Eberhard Hüppe, translated by Richard Polex Münster, Germany

Like no other genre, the music theater of recent years has been subject to polarization. On the one hand, conventional institutionalized methods have a tendency to place their mark on all concepts that are open to compromise. On the other hand, intelligent ideas that diverge from normal operatic procedures shift the actual events in the opera to the audience by aiming at a static set—which comes close to eliminating the visual scenario. The drama consists of making the audience aware of the dramatic possibilities of its own sense of hearing. To achieve this, it is absolutely necessary to embrace the incongruity of hearing and seeing. Karlheinz Stockhausen, Morton Feldman, Luigi Nono, Helmut Lachenmann, and John Cage developed concepts for the aesthetic-cognitive problems of the opera genre, which led to widely diverging opinions on dramatizations of cognitive dissonance (not necessarily of the sounds). Internal, culturally determined inconsistencies of perception are the domain of music theater, of the high-brow avant-garde. This is also the starting point for Georg Hajdu's opera project *Der Sprung* (based on a libretto by Thomas Brasch), which premiered—with René Gulikers conducting and Georg Hajdu controlling the sound—on 2–3 October 1999 in Münster, Germany.

Der Sprung is based on a tragic incident that took place in 1984 at the University of Cologne: a female student shot and killed a professor of Jewish studies, and seriously wounded another. An investigation of the incident revealed the tragic entanglement of a personal and a national malady. It turned out that the schizophrenic student felt that because of German-Jewish history including the Holocaust, it bordered on the criminal for a non-Jewish professor to teach Jewish studies. She had converted to the Jewish faith and, as a result, felt justified in committing murder.

Literature as analysis: Thomas Brasch combines the crime and its genesis, including personal notes and information about the student's environment, as a drama of ideas. The result is a tableau of the most diverse elements, and this carries over to the music as well. What is the connection between a jump from a diving board with Mick Jagger, the inhabitants of a terrarium, and a woman who has wrapped herself in a prayer shawl? Mr. Brasch's conception makes it necessary for the music to bring the disparate elements together.

The use of interactive computer technology, which is a further development of serialism for controlling both the act of composition and the performance situation, necessitates "software of the second degree" to start the artistic process. Such software can be found in everyday life, but one has to be able to recognize it as such.

The point of departure for the music and the libretto stems from an offhand remark made by Mr. Brasch: "Writing an opera means having no other way out." Mr. Hajdu asked him to repeat the sentence on his answering machine. By transforming it into diagram form via sound analysis, by setting a time frame and measuring the sections to determine the structure (dividing it into "slices of time," according to the composer), the sentence became the structural formula for an eleven-part libretto and a two-act opera (each divided into four scenes) with a prologue, intermezzo, and epilogue. The student is portrayed by an actress in a speaking role who writes the key sentences of each scene on a blackboard. The opera includes elements of a radio play. Eight female and male singers sing at times solo, at times united as a chorus. They are also linked to the electronic equipment via microphones and headphones. The chamber orchestra, with its 20 musicians, includes—apart from the conventional instrumental formation—3 synthesizers and a jazz group. The coordination of the entire group is carried out by computer.

Each scenic moment is clearly defined in terms of its exact episodic content. The horizontally oriented plot has been constructed vertically to make the drama of the heterogeneous events vivid and clear. This is achieved through the use of electronic music. But Mr. Hajdu's musical style, as indicated by his instrumentation, is meant to offer a cross-section of styles. Thus, each scenic moment has its own language of sounds. The "water music" in the prologue, which deals with a dive from the diving board, uses specific sounds from a swimming pool, transformed and heightened by live electronic effects. The text is projected into this soundscape and becomes part of the transformation brought about by the sounds. The sensual result is a static, ornamental, fluctuating music.

Mr. Hajdu prefers to use the orchestra for plot-driven scenes with dialog; here the music is impulsive and full of gestures and elements from traditional genres. The orchestra is also the medium used to depict stylistic transformations, to illustrate the past, as in the jazz-rock allusions in one of the scenes from the first act, which deals with the muddled alternatives considered by the protagonist. The "destruction" of Mick Jagger by throwing away his records (as a result of an imagined affair with him) is already on the level of an intent to kill, also motivated by an imaginary relationship with the instructor at the Institute for Jewish Studies. "I can't get no satisfaction" has been incorporated into the music. Mr. Hajdu is not interested in composing authentic jazz-rock, but in transforming it through the use of serialistic elements into a strange, synthetic form. The scene that describes the criteria for buying the murder weapon works in a similar fashion. "The weapon should be one from the Middle Ages" (act 1, scene 4) engenders echoes of *Ars Nova* while fake klezmer music accompanies the drama of the fake identity in act 2.

Mr. Hajdu is working toward the conceptualization of a kind of semantics which, as Mr. Brasch has formulated it, is the semantics of observation. For this, different styles of language are necessary. The observation of the opera's semantic levels leads the listener to the spoken structural formula on the answering machine, or, to be more precise, to its background noise. A discussion of the complex structure of the intermezzo (chorus and live electronics) would take up too much space here. Various sections with long glissandi, each with a different harmonic structure in a microtonal system, become clearly audible, resulting in something that sounds like spectral music. It could even be described as an extended chorale. The intermezzo can be seen as the musical climax of the opera. The microtonal harmonic progression is taken up in a rondo-like scene for solo alto (in her lowest register) and live electronics, reflecting on the conditions of "speaking another language." In this micro-intervallic environment, we hear a re-synthesized, tonal sound world which, instead of being irritating, has an iridescent effect. There are continually descending sequences of notes in various parts whose order cannot be foreseen, and which could well continue into infinity.

In order to achieve the "schizoid" structure of a drama of ideas, and to make the structure audible and, as far as possible in concert, visible (for the staged realization, videos are added), it is necessary to make use of all forms of multimedia capable of producing both integration and dissociation. The form that Mr. Hajdu and Mr. Brasch have given their drama of ideas requires conceptual, constructivist, and deconstructivist methods. While constructivist elements are necessary for the creation of any type of musical structure, the cultural disparity of the event is revealed through the use of deconstructivist methods. The various meanings that exist for the German word *sprung* (leap, jump, dive, crack) lead to the opera's wide spectrum of associations. The disparity of the cultural levels corresponds to the variety of compositional styles. The composer develops a dramatic structure out of various layers of multimedia transformations, which are at the same time equivalent to the structure of the drama of ideas. This is why language and music are intertwined from the very beginning.

Thus, we return to the sentence "Writing an opera means having no other way out." What this means is the desire to create an identity that lies somewhere between drama and structure, and that the beginning and end of the route taken will reveal differences, "leaps." One leap consists of linking the act of hearing to the events on stage. Richard Wagner's *Gesamtkunstwerk* was the first step in this direction. While his form of *Gesamtkunstwerk* is inextricably linked with the aesthetic discourse of the industrial revolution, the work of art that relies on multimedia concepts—as referenced by Frederic Jameson—can no longer be explained by this historical notion. The multimedia work of art serves to make perception possible dramatically as well as structurally, and it is the active roles of perception and consciousness that are prerequisites to perceiving anything beyond hallucinations. This is true both in both an artistic and a political sense.

Technology and Teaching Music

1999 Annual Meeting for the Association for Technology in Music Instruction, Denver, Colorado, USA, 14–17 October 1999

Reviewed by William Hussey
Chicago Musical College of Roosevelt University
Chicago, Illinois, USA

How many times have you heard the phrase "taking us into the next millennium" in the last three or four years? Usually at the end of a decade, those who forecast the state of tomorrow speak only of the following decade, but in the late 1990s, the talk of the future has looked to the entire next century. The future of technology and the prospects of its application are often at the center of these conjectures. The infinite potential of computers and their role in the 21st century can be both exciting and daunting, particularly for those who are just barely keeping up with the advancements of today. Subscription to technology periodicals and list-serves can help us keep current, but strangely enough, considering the subject, there is no substitute for human interaction.

The Association for Technology in Music Instruction (ATMI) is just such an organization for music educators to get information and instruction on current trends in technology from their colleagues. The 1999 annual meeting of ATMI, which took place 14–17 October in Denver, Colorado, offered presentations for both novices and power-users. Exhibitions demonstrated music applications for use on and off the Web, introductions to the creation of such applications, and current directions for technology in music curricula. Most importantly, these presentations were given by individuals who are experienced as educators and as programmers. Many of the presentations were working demonstrations of the hardware and software discussed, providing those attending the conference with a clear understanding of the technology and its possibilities.

Although the use of technology is increasing in K–12 music education, the conference presentations were primarily aimed at the collegiate level. Instruction in music theory dominated the topics, including a poster session made up primarily of music-theory applications presently being used at universities across the country. Those attending the poster session were given demonstrations of the software, and had their questions answered by the creators themselves.

Music-theory programs given in formal presentation included a professional aural-training application that features elementary to advanced dictation exercises with MIDI playback, an electronic theory text that teaches harmony from a contrapuntal approach, and an application for audio CDs that allows instructors to display their own commentary on the music during playback. Programmers discussed their difficulties and discoveries, including Ann Blombach, creator of the popular ear-training software MacGamut, who spoke on her experiences converting the Macintosh-only program for use on the Windows platform. These presentations provided those attending the

conference with examples of the types of software being developed for university music programs across the country.

The subject of teaching music fundamentals through technology appeared in several presentations. As college music-theory teachers deal with incoming students who lack basic music skills, many of these professors have developed on-line help utilities. These programs include Web pages with basic information for extra help, advanced-placement work for high-school musicians, and complete on-line university courses. Many programs exhibited evaluation procedures, demonstrated the advantages of immediate feedback, and indicated the positive results of extra-curricular work by remedial students. The proliferation of these programs confirms the growing use of on-line instruction to eliminate the fundamental music deficiencies of many incoming freshmen.

Pedagogy in music composition was also featured at the conference. Presentations included illustrations of the uses of technology in composition pedagogy, integration of the Internet into teaching composition for music-education majors, as well as advanced topics in algorithmic programming for electronic composition.

In many music schools, the application of distance learning often seems to be limited to the academic disciplines—after all, you can't teach someone how to play the violin over the Web! However, the distance-learning exhibits at ATMI set out to disprove this common misperception. A computer drill for teaching foreign-language diction was shown at the poster session, and the final session of the conference included a panel discussion on distance learning and performance, in addition to a presentation on interactive televised instruction for strings.

Although many presentations were exhibitions of applications that had been created by the presenters, there were also demonstrations of the programs used to create music applications. These sessions introduced the authoring programs Director, RealBasic and HyperMidi, Quicktime Player, and the Web-authoring tool Dreamweaver. All presenters exhibited both elementary and advanced programming techniques, creating basic applications during the presentation and showing the special features of their completed applications to illustrate programming possibilities for those interested in creating their own.

Naturally, the use of the World Wide Web was a primary topic of the conference. Not only does the Internet provide the opportunity for distance learning, but it also eliminates the problem of applications that do not accommodate both Macintosh and Windows platforms. The ATMI's president, Peter Webster, and vice president, David Williams, gave two extended presentations entitled Using the Web: Innovative Models for Using the Web in Music Instruction. Although these sessions were somewhat overwhelming in their content, the scope of the presenters' knowledge was impressive. They showed examples of current music Web pages from various universities around the country, ranging from those that simply list information to advanced pages for entire on-line courses. Although the presentation boasted that there was little technical knowledge required to use the Web, more elementary demonstrations of Web creation would have been helpful to the novice user who would likely have been intimidated by the deluge of information these presentations contained.

A highlight of the conference was a panel discussion titled Designing and Offering a Music Technology Degree. Each of the four panelists had instituted a music-technology degree at their respective universities, and provided those attending with detailed lists of their curricula. They discussed various roadblocks that they encountered in creating their degrees, such as objections from administration and faculty concerning details of the curriculum, and obtaining equipment and facilities. They also noted the popularity of their programs and the high placement of graduates. With the growing demand for degrees in music technology, this presentation was well attended.

The panel discussion entitled So Much to Teach, So Little Time was a rare disappointment at this conference. While most other presenters demonstrated excellent preparation and few technology failures in their presentation (the latter being a major accomplishment!), this panel was disorganized, had several technical problems, and failed to enlighten those attending on their topic. Most of the panel members listed the technology and facilities present at their schools but gave little insight to the way that they were used to save teaching time.

Despite this one disappointing session, the conference as a whole was informative, up-to-date, and thoroughly practical. Not only did the presentations give clear indications of technology trends in the profession, but the presenters were pleasant and eager to help those with questions. [Many presenters were asked to lunch or dinner to discuss their topics further with eager members of the association.] Unlike some conferences, where topics lean toward the esoteric and deeply intellectual, this conference provided useful, diverse, and practical information for music educators about the technology available today, leaving the next millennium to take care of itself.

Those interested in learning more about the Association for Technology in Music Instruction can go to the association's World Wide Web site at www.music.org/atmi/. Session titles for the 1999 ATMI conference included: A Primer for Developing Web-Based Courses, Electronic Poster Session, Authoring Tools I and II, Using the Web I and II, Music Education and Technology I and II, Music Theory and Technology, Curriculum and Technology I and II, On-Line Courses I and II, Software Development, and Distance Learning.

IRCAM@Columbia 1999

Columbia University, New York, New York, USA, 15–21 November 1999

This past November, Columbia University hosted a series of concerts, lectures, and workshops by Institute de Recherche et Coordination, Acoustique/Musique (IRCAM) in New York City. The concerts took place on Monday, 15 November and Thursday, 18 November at Columbia's Miller Theatre, and featured the compositions of Jonathan Harvey, Magnus Lindberg, and Tristan Murail. The lectures and workshops were presented on Friday, Saturday, and Sunday, 19–21 November. These included participation by several prominent IRCAM personalities, including Pierre Boulez, Laurent Bayle, Eric De Visscher, Andrew Gerzso, Mikhail Malt, and Manuel Poletti. The following text reviews each of the week's events.

The Music of Jonathan Harvey
Ensemble 21, with technical assistance by IRCAM

Reviewed by Christopher Bailey
New York, New York. USA

The first concert of IRCAM@Columbia was devoted to the music of composer Jonathan Harvey; the works performed ranged from fairly recent (1994) to relatively well established (1980). Mr. Harvey has had several residencies at IRCAM, and the influence of the techniques he has learned and utilized there could be heard both directly, in the case of works featuring electronics, like *Mortuos Plango, Vivos Voco* and *Tombeau de Messiaen*, and indirectly, in the case of works like *The Riot* and *Nataraja*.

The latter, a fiery duet for flute and piano, opened the concert, played brilliantly (as was the entire program) by Ensemble 21. As is often the case, the pianist was utilized in every piece; and this pianist, Ensemble 21's codirector and rising star on the new-music performance scene, Marilyn Nonken, deserves special kudos for her unceasing energy and vitality in performance throughout the evening. *Nataraja* is a work filled with wonderfully varied textures and scintillating instrumental writing, woven together into a clear, satisfying kinetic-formal design. This listener heard perhaps a whiff of Karlheinz Stockhausen's *Mantra* (Mr. Harvey, as you may be aware, wrote the book *The Music of Stockhausen: An Introduction*), especially in the way the music, on occasion, would suddenly become obsessively repetitive. The "indirect" relation to the composer's IRCAM residencies could be heard in the work's tasteful use of spectral techniques.

Nataraja is a piece with several dance-like scenes; *The Riot* (flute, bass clarinet, and piano) seems to take "the dance" as its basic *raison d'être*. From the title, one might expect some chaotic din to be the principle mode of expression, but in fact it's a much more controlled gathering of thematic characters. The main formal gist of the piece seems to be a series of clear sections (though with very smooth elisions between them), each based more upon a textural idea than a thematic one: irregular dance-like figures, upward sequences (reminiscent, perhaps, of Shepard's tones), etc. Just as *Nataraja* and *Mortuos Plango* (as discussed below) contain bits of homage to Stockhausen, so *The Riot*, perhaps owing to its orchestration and its dance-like nature, owes a small debt to Stravinsky: the opening of the piece sounds somewhat like *Symphonies for Wind Instruments*.

Likewise (and obviously), *Tombeau de Messiaen*, for piano and tape, contains hints, in its block harmonies and birdsong-like rhythmic patterns, of the master to whom it is dedicated. The use of microtones, though, actually sets it quite apart from Messiaen. *Tombeau* is an effective piece, featuring the ringing, beating relationships between justly intoned chords on the tape and their equal-tempered almost-alikes in the piano.

Mortuos Plango, Vivos Voco, for recorded quadrophonic sound, is quite an old piece, hailing from 1980; its somewhat dated techniques might cause a few groans from the most hard-core computer-music nerds, but, like another old quadraphonic work, *Gesang der Jünglinge* (Mr. Stockhausen again), it is still very effective musically and formally. The piece is based upon the sounds of a huge cathedral bell and a boy soprano Personally, I find myself waiting for the haunting final moments, a simple texture consisting of the ringing bell with vocal interjections multiplied into the gorgeous spectral chord derived

from the bell itself. Concerning the "performance" of the piece, it was lovely. The IRCAM technical team had Miller Theatre set up for thorough sonic immersion.

The last work on the program was *Song Offerings*, for soprano and chamber ensemble. Though it offered many sonic beauties, this work satisfied me less, due either to a less-than-stellar performance by the soprano, Judith Bettina, or perhaps to a deeper issue: the appropriateness of a traditional operatic singing style to Mr. Harvey's musical aesthetic. Specifically, his meticulous manipulation of harmony and pitch seemed to clash with the inevitable "devil-may-care" (what pitch is being sung) vibrato of a classically trained singer. The parts of the cycle that were most successful were the chanted sections: the first movement, for example, which contained mono-pitched chants over a constantly changing harmonic-timbral complex; and the last movement, where the singer seemed to use less vibrato, at least at the beginning. The instrumental writing was beautiful as always, especially the music in between the verses of the text during the last movement.

Works by Magnus Lindberg and Tristan Murail
Ensemble Sospeso, with technical assistance by IRCAM

Reviewed by Oliver Schneller
New York, New York, USA

Throughout the past two decades, IRCAM has been an expanding forum for collaboration, exchange, and innovation, and a trigger for a broad range of technological applications in music. It seems that such an integration of the creative powers of researchers, engineers, composers, and instrumentalists has become a productive model leading to some of the most interesting pieces in recent contemporary music. Perhaps it is relevant to note that both featured composers of this evening's concert had been important members of collaborative associations before they came to IRCAM: Magnus Lindberg in the Finnish "Ears Open!" Society, and Tristan Murail in *L'Itinéraire*, an ensemble of composers and instrumentalists.

Composers who visit IRCAM today often learn similar things to what they would elsewhere. However, it is in the way they are subsequently enabled to implement this knowledge in their creative work and in the collaboration with the programmers and engineers that the primary contribution of IRCAM to contemporary musical composition lies. The differences between creative personalities remain untouched by the exposure to the possibilities IRCAM has to offer, as became evident in listening to the music of Mr. Lindberg and Mr. Murail.

Mr. Lindberg's *Related Rocks* (1997), for two pianists, two percussionists, and electronics, opened the concert with a bang that builds—a formal trajectory that is frequently found in his works. Pianists Stephen Gosling and Eric Huebner and percussionists Tom Color and Pablo Rieppi performed this piece with breathtaking agility. The electronics, brilliantly managed throughout the concert by IRCAM's Eric Daubresse and David Poissonier, needed subtle balancing since the soundfiles, triggered by the pianists on MIDI keyboards, often had to fuse with the dense textures in the percussion or piano parts. However, the transformations of these sounds—derived from a baroque cello and the rather rare sounds of the physical destruction of a grand piano—often remained outside the initially somewhat minimalist sonic world established by the pianos and percussions. Clearly, the composer was more concerned with the layering and interaction of heterogeneous materials than with their fusion to form a hybrid compound. Later, this process, with its restless activity across all registers, translated into a rapid and frivolous juxtaposition of identifiable stylistic allusions—Chopin, rock, boogie-woogie—with cartoon-music-like pacing.

It would be safe to say that the attributes of the second piece on the program, Mr. Murail's *Bois flotté* for amplified ensemble and electronics, also from 1997, were the direct opposite of those of *Related Rocks*. Here, the form unfolded like a slow-motion sequence, occasionally punctuated by sonic "pillars" of resonant depths. Following the captivating opening—a calm, chorale-like progression of overlapping sonorities (derived from a microscopic analysis of water sounds)—most of the remaining sources were easily identified as being reminiscent of water sounds: trickling, droplets, waves breaking on a shore. The electronic metamorphosis of these sounds and the way the ensemble music was composed around them turned their familiarity into the clarity of scintillating musical gestures mediated by quiet transitions. The material was economic, yet rich in color. Compared to other compositions by Mr. Murail, the prerecorded sounds had a great deal of weight and space in *Bois flotté*. Perhaps the title gives a clue: the wood (ensemble) seems "afloat" on an undulating surface of electronic sounds in constant motion.

Mr. Lindberg's *Ur* (1986), for amplified ensemble and electronics, featured the rapid-fire world of extreme horizontal and vertical density that characterized many of his earlier pieces for orchestra. *Ur* is intricately composed in such a way that one often seems to be hearing more than the five instruments it is scored for. Like *Related Rocks*, the piece is relentless in its bold perpetuum mobile energy. The music does not shy away from the plentiful use of extended techniques, and there is a remarkable episode where the cello's lowest string is detuned. The virtuosity of the ensemble writing is at times engaged in a challenge against the potentially overpowering electronics, and much of the sustenance of the piece derives from the composer's keen sense for the dramaturgical disposition of his forces. The piece certainly lives up to its title; *ur* in German implies being of archaic origin or energy.

Mr. Murail's *L'esprit des dunes* (1993–1994), for amplified ensemble and electronics (sampled sounds triggered by a MIDI keyboard), starts with a characteristic ascending figure that is passed back and forth between the oboe and the sampled sounds, mediated by the flute. Over the course of the piece, the origin of this motif is progressively revealed by the gradual accumulation of partial strata that occasionally fills in the whole spectrum at sonorous anchor points. In the composer's words, "There is melody within a single pitch; the melody is created through the pitch's harmonics. It's both a sound and a melody. And while the opening notes of the oboe constitute a phrase, it is also a sound." The origin of the motif is in fact a snippet from an overtone "melody" found in Mongolian chant, a tradition that can be described as the art of creating (overtone) melodies out of a single (sung) pitch. The vocal paradigm is felt in various forms throughout the piece: strands of kinetic energy that produce a pattern of tension and release, the alternation of compact and diffuse ensemble writing with the occasional appearance of resynthesized Tibetan chant, and the overall dynamic curve of the form make the piece breathe in a curiously organic way.

All four pieces received superb, energetic, and imaginative performances by the Ensemble Sospeso under their excellent conductor, Jeffrey Milarsky (*Bois flotté* and *L'esprit des dunes* were American premieres). The integration of the exemplary musicianship of the ensemble under Mr. Milarsky and the expertise of the IRCAM sound engineers made the evening a great success.

IRCAM Forum @ Columbia: Lectures, Conversations, Demos

Reviewed by Douglas Geers
New York, New York, USA

On Friday, 19 November, several of IRCAM's most noteworthy denizens presented a day of lectures and demonstrations regarding current activities there. The day-long events were free and open to the public, and an impressive crowd of over 300 people attended. The highlight of the day was Pierre Boulez's conversation with Eric De Visscher. No doubt, Mr. Boulez's participation helped attract the large audience, and it seemed that many in the crowd were inexperienced at computer music and the activities of IRCAM. Thus, these lectures provided an excellent opportunity to inform the wider community about the creative possibilities of computer music and, more specifically, what IRCAM has done to promote these.

After a brief introduction by Thanassis Rikakis, associate director of the Columbia University Computer Music Center, Laurent Bayle, director of IRCAM, delivered a lecture entitled "IRCAM Today and Tomorrow." In his talk, Mr. Bayle discussed IRCAM's current activities in several areas, including composition, research, and education. To the non-computer musicians in the audience, this lecture was probably quite informative; however, to those of us familiar with IRCAM, it did not contribute many new ideas.

Next, Andrew Gerzso, IRCAM forum manager and technical assistant to Pierre Boulez, spoke about the IRCAM Software Forum. He explained how and why the forum originated, its development to the present day, and the benefits of membership. I think he spent a bit too much time on demographics and statistics; rather than intriguing the audience with creative possibilities, it was a business-type report. In general, I think both of these lectures would have benefited from some condensation and a more conversational delivery, especially given the nonspecialist nature of the audience.

After Mr. Gerzso's lecture, Pierre Boulez took the stage with Eric De Visscher, artistic director of IRCAM. Mr. Boulez was in New York to lead a series of performances at Carnegie Hall, where he is now the composer-in-residence. Mr. Boulez, a charming and witty speaker, began by discussing his first experiences with electronic music at GRM, working with Pierre Schaeffer. He stated that his early enthusiasm for *musique concrète* had diminished as he performed his early experiments there. To him, Mr. Schaeffer's compositional methodologies and techniques were not a sophisticated enough match for instrumental music.

Mr. Boulez also criticized the early synthesized electronic music of others, such as Karlheinz Stockhausen, because the timbres

were too simple for his taste. However, he became intrigued by electronics once again after hearing Mr. Stockhausen's *Gesang der Jünglinge*. The combination of recorded and synthesized sounds in this work was deemed successful. During the early 1960s, Mr. Boulez attempted some works using electronics, including a piece for orchestra and tape which he has since withdrawn. Once again, he was not satisfied. He told the audience that he eventually decided not to work with sounds on tape and to wait until electronics could be more responsive.

Mr. Boulez continued by describing his conception of IRCAM and his efforts to make it a reality. He mentioned that he had tried strenuously to ensure that his vision was not compromised. He achieved this by making IRCAM a unique entity—that is, not a subsidiary of any other cultural organization. As a result, funding and decision making need not be funneled through additional layers of bureaucracy. He also reiterated that the focus of IRCAM should remain on the composers and helping them realize their music.

Mr. Boulez spoke for approximately 45 min, fielded some questions, then dashed off to another rehearsal. His performances that week with the Ensemble InterContemporain featured an all-Boulez program including the American premiere of *Anthèmes 2*, for violin and electronics.

The remainder of Friday's lectures focused on software developed at IRCAM and available through the forum: Audiosculpt, OpenMusic, Max/MSP, and Spat. First, Mr. Gerzso introduced Audiosculpt, an elegant graphic interface for manipulating the time and frequency data of soundfiles. His presentation was clear, brisk, and peppered with clever, humorous comments. Next, Mikhaïl Malt gave a talk on OpenMusic, a graphical compositional sketchpad program and successor to Patchwork. The final speaker of the day was Manuel Poletti, who discussed Max, MSP, and the Spatialisateur. The last of these is an impressive algorithm that can be utilized from within Max, capable of eight-channel spatialization (more channels are possible if one has a powerful enough computer with the appropriate sound card). Mr. Poletti concluded by creating an impressive and hilarious demonstration, simulating the sound of one's apartment during a rainy evening in Paris.

IRCAM Forum @ Columbia: Workshops

Reviewed by Elaine Thomazi Freitas
New York, New York, USA

Closing the week of IRCAM activities at Columbia University were two days of workshops on IRCAM techniques and software at the Columbia Computer Music Center. These workshops gave 48 participants the possibility to examine more closely IRCAM's universe of computer-assisted composition and real-time systems. Within the same time frame as the IRCAM Summer Academy, these two days of hands-on activities provided a sort of "fast-food" instructional approach to a very heterogeneous group of students. The workshops focused on AudioSculpt and OpenMusic, Max/MSP, and Spat, under the instruction of Mikhaïl Malt and Manuel Poletti.

The participants spanned a wide range of backgrounds and experience: Columbia University graduate students; faculty and students from other US institutions such as MIT, University of Chicago, Dartmouth College, University of Iowa, Connecticut College, and others; industry representatives; and several independent computer music composers, including Judy Klein, David Gomper, and Daniel Oppenheim. Obviously, there is increasing interest among American composers and technicians in IRCAM activities.

Both Mr. Malt and Mr. Poletti showed the basics of all the software in a friendly atmosphere. In fact, that almost became a problem, since everybody would have loved to be able to spend at least one day on each of the workshops. But this happens at the workshops in Paris as well, and maybe it is a part of their merchandising policy. Moreover, the attendees were mostly rather experienced computer musicians, and thus did not need to be taught the basics of the software; but that is something to be considered for later occasions.

The students were divided into two groups of 24, each seated in a room with several G4 Macintosh computers with headphones and all the IRCAM software installed, so that they could work along with the instructor. This provided for lively exchanges between students and instructors, and proved quite effective.

Going back to the software itself, OpenMusic, an object-oriented environment based on Common Lisp, has been designed as the successor to Patchwork. It is visually attractive, and features the ease of a colorful graphical interface, good for those moments of "what's next?"

Musically speaking, most of the old Patchwork libraries are incorporated into OpenMusic, and it seems to be not that difficult to translate old personal projects to the new environment. One novelty is Maquette, a graphical interface for arranging musical materials. This brings to the screen those old sketches every composer once made, and that some people still use. The idea of creating some sense of layered space is quite interesting, even though it gives us the idea of searching for a new musical notation. But the main point is that it is possible to touch the musical material directly (patches, MIDI files, soundfiles, or even another Maquette), within a time-oriented structure.

AudioSculpt is software for the analysis, processing, and spectral editing of sound signals based on phase vocoding. It is supplied with a great graphic interface, perfect for scrutinizing the spectrogram of a given sound. AudioSculpt was designed to pass analysis data to Patchwork for compositional manipulations. It also works well with OpenMusic, allowing not-so-technical people to manage their materials in an intuitively musical approach. However, considering that AudioSculpt is a relatively old piece of software, it seems that not much has been done with its technical development lately. Of course, the short time span of the workshops was not enough to show and try everything, but it was very nice to learn a few tricks without reading the manuals. This is such a rich program, however, that it was tempting to go back to the lab afterwards to explore more of its possibilities.

The Max environment, now enhanced by MSP, still offers many possibilities for those interested in creating interactive works. Max, a graphically based software for real-time and interactive applications, has been the main tool for MIDI control and interactive multimedia environments for nearly a decade. Currently, MSP works as a set of Max extensions that add audio capabilities to it (allowing synthesis, analysis, and processing of audio signals in real time). The workshop was introductory in character, pointing out a few interesting details for building patches and presenting ideas for expanding the musical horizon with the collaboration of visual artists, dancers, and others. Nothing concrete, though, was presented in that field.

The Real-Time team has recently given birth to an amazing new device named Spat (Spatialisateur), a well-conceived Max patch. As suggested by its name, Spat creates the idea of a virtual space, allowing the composer to have precise control over the positioning and projection of sound. Even though it is supposed to work fine both in stereo and in quadraphonic environments, it achieves its most perfect level of virtual reality when used in a quadraphonic system. The great thing to note is that its spatial conception comes from psychoacoustic research instead of physical data, resulting in a more realistic acoustic experience. In terms of interest, the choice to close the week-long activities of IRCAM@Columbia with Spat was a very good one; the participants went home with a great reference for starting new projects, improving current ones, or revising old ones. And that was perhaps the main purpose of this event.

Publications

Jerry Tabor, editor: Otto Laske: Navigating New Musical Horizons

Greenwood Press, 1999, 232 pages, hardcover, illustrated, bibliography, index, ISBN 0-313-30632-X; available from Greenwood Press, 88 Post Rd. West, Westport, Connecticut 06881, USA; telephone (203) 226-3571; fax (203) 222-1502; electronic mail customer-service@greenwood.com; World Wide Web www.greenwood.com

Reviewed by Thomas Licata
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The Hague, The Netherlands

Otto Laske has not only been challenging the established norms in the creative arts and sciences for nearly three decades, he has been and is still actively engaged in proposing innovative, provocative, and often far-reaching alternatives. His contributions in cognitive musicology and composition theory, methodologies rooted from an interdisciplinary perspective, have not only reshaped the ways in which musical composition and analysis are considered; his influence has spread to creative arts in general. Furthermore, as his work has influenced numerous other disciplines including computer science, artificial intelligence, and psychology, it is likely that the full impact of his thought, particularly with the widespread application of computer-based technologies in many areas of artistic inquiry and research, has yet to be fully realized.

Otto Laske: Navigating New Musical Horizons, edited by Jerry Tabor and published by Greenwood Press, is a thorough and wide-ranging collection of essays that goes a long way in documenting this man's life and work. With contributions by noted international scholars traversing such disciplines as composition, music theory, cognitive musicology, and computer science, this book offers a comprehensive, interdisciplinary look at Mr. Laske's important theories and creative activities. Moreover, there are numerous chapters in which various authors not only examine his work, but also present and discuss their own research in light of how it was shaped and influenced by him, perhaps the highest tribute one can offer.

The editor of this volume, Mr. Tabor, of Salisbury State University,

opens the book with an introductory essay entitled, "A Pioneer in Composition and Research." This chapter gives a clear and succinct overview of Mr. Laske's background as well as the important influences that have shaped his thinking. The author supplies informative explanations of Mr. Laske's adaptation and subsequent modifications of various concepts borrowed from linguistics and psychology, thereby clearly laying out many of the concepts discussed and elaborated upon throughout the course of the book. In addition to the theoretical contributions, Mr. Tabor also stresses the importance of Mr. Laske the composer: "it is likely that one of the reasons [his] research has had such an impact on theoretical discourse is that he is himself an impressive participant in the musical creative process." As such, the editor provides a comprehensive survey of Mr. Laske's compositional output as well as the various programs/task environments he used in creating them.

Following this introduction, the book is divided into three parts: part 1, Composition and Composition Theory, focuses on the process of composing with computers; part 2, Cognitive Musicology, concentrates on the process of "doing" music, that is, carrying out such tasks as composing, analyzing, and listening; and part 3, Composition and Cognitive Musicology in Practice, shows how Mr. Laske himself incorporates his concepts directly into his own research, artwork, and various other activities. Closing out the book there is an extensive bibliography including major writings and much of Mr. Laske's other theoretical and compositional contributions.

Composer Barry Truax, of Simon Fraser University, contributes the first chapter of part 1, "Sonology: A Questionable Science Revisited." Mr. Truax, who was at the Institute of Sonology when Mr. Laske began formulating his theories there in the early 1970s, offers a first-hand look at the major influences and developments Mr. Laske underwent during this time. Through his later work with the World Soundscape Project (WSP), Mr. Truax reflects on how he came to discover that Mr. Laske's fundamental ideas of sonology "so aptly applied to the new approach to the soundscape the WSP was trying to formulate." Mr. Truax proposes some thought-provoking ideas about the future development of tape music: "In the future, we may very well come to realize that musical competence based on abstract relationships in sound is merely a specialized version of environmental sound competence."

"Structure as Performance: Cognitive Musicology and the Objectification of Compositional Procedure," by composer and researcher Michael Hamman, considers various aspects of Mr. Laske's theoretical work as it relates to the interrelationship between the human/computer creation of artifacts. Through clear and concise writing, Mr. Hamman details the importance of computers in helping to further understand this relationship. As the author asserts, "computers become not merely tools for the making of artistic works; they become instruments for the objectification of the very processes by which such works might be made."

Gottfried Michael Koenig, a pioneer in computer music, contributes an illuminating essay entitled "PROJECT 1 Revisited: On the Analysis and Interpretation of PR1 Tables." Mr. Koenig discusses the early developments of his very important composition program, Project 1. He revisits Mr. Laske's first exposure to this program as well as his subsequent integration of his own program (PRECOMP) with that of PR1. With detailed attention to PR1 score-table output, the author describes, through numerous pages of musical examples, how one might read and interpret these tables.

Another composer, Joel Chadabe, opens part 2 with "A Brief Overview of Mr. Otto Laske's Work." Mr. Chadabe is a long-time friend and colleague of Mr. Laske, and thus offers a very personal and intimate look at the man and his work. Based on private conversations, Mr. Chadabe reflects on the early developments of Mr. Laske's thought and the significance of his work. He writes: "Mr. Laske's ideas, in short, help us understand how to achieve and cause others to achieve higher levels of musical creativity and reward."

In "Portrait of an Extraterrestrian," by Bernard Bel, a computer scientist, the author examines Mr. Laske's concepts of competence and performance. Mr. Bel discusses the applicability of his theories to his own study of non-Western music, namely, the tabla music of India. He regards that "the issue of musicality raised by Mr. Laske is of great relevance outside the Western musical world from which it originated."

Marc Leman, professor at the Universities of Ghent and Leuven in Belgium, contributes "Adequacy Criteria for Models of Musical Cognition." Mr. Leman asserts that a paradigm shift in cognitive science, from a Cartesian (cognition independent of the sound environment) to a more naturalistic approach (cognition highly dependent on the sound environment), "has profoundly changed the way in which we now think about musical representation and memory control." Furthermore, he maintains that because of "the increasing interest in computer modeling, it is important

to look at how computer models are currently evaluated and justified." Through careful and impressively detailed analysis, Mr. Leman assesses current adequacy criteria used in computer modeling as seen from both the Cartesian and naturalistic perspectives.

In "Modeling Musical Thinking," by Jukka Louhivuori, a cognitive scientist, the author discusses his use of musical models in order to further his understanding of Finnish folk song and the oral tradition. Mr. Louhivuori provides absorbing insights into this memory-dependent tradition. He also discusses the implementation of artificial neural networks for modeling musical thinking, and offers thoughtful predictions about future applications of these systems.

Part 3 begins with "A Composer's Cognitive Musicology," an interview by Nico Schuler, professor at Greifswald University, Germany. Many of the ideas put forth throughout the book are here commented upon by Mr. Laske himself. Through Mr. Schuler's astute comments and questions, he touches on many of his early influences, including his need to distance himself from traditional musicology, accomplished not only by cognitive processes, but by the simple, physical act of getting on a boat to America: "When the ship took off from the Bremerhafen pier, European history fell off my shoulders like a huge burden." He also offers many other candid and revealing insights about his life and work. As the collected papers of this volume have all spoken of Mr. Laske, he speaks here for himself: "The key for me is and has always been epistemology. In everything I have ever done—composing, writing poetry, doing philosophy, musicology, AI, etc.—the question for me has always been: What is knowledge in this domain, and how can I know myself and the world?"

In the first of two papers by Mr. Laske himself, "Furies and Voices: Composition-Theoretical Observations," the reader is presented with a discussion of his tape piece, *Furies and Voices* (1990). With the first sentence, Mr. Laske affirms the underlying thrust of his compositional theory: "I am interested in the question of how the control structure of a compositional process determines the form of the musical work the process produces, and in the impact of working with computers in composition on answers to this question." This composition was created in a studio (at Simon Fraser University) whose task environment was unknown to the composer in advance, and consequently provides a revealing look at many of the processes Mr. Laske went through in composing it.

In the second paper, "Creating Music as an Articulation of Prelinguistic Senses of Self (A Lecture)," we get a glimpse of Mr. Laske as developmental psychologist. Here, he reaffirms his interest in furthering his understanding of an artist's development through life. He discusses his ethnographic research of living poets, musicians, and visual artists, and offers intriguing findings and conclusions. At the root of his hypothesis, Mr. Laske postulates "that creating music, and art generally, is an attempt to articulate prelinguistic senses of self, or modes of experience already mastered in infancy."

The final chapter in the book, "The Newcomp Experiment," is by Curtis Roads, visiting professor at the University of California, Santa Barbara. Mr. Roads chronicles the events that led to the creation of the New England Computer Arts Association (Newcomp), an organization that he and Mr. Laske founded. He details the organization's many efforts to build new audiences, educate artists and the community, establish workshops, and sponsor an annual composition competition. He concludes his essay by stating that, "It [Newcomp] was a noble experiment, and I hope it will serve as an example to future generations of creative artists."

Finally, there is an extensive bibliography (15 pages) comprising all of Mr. Laske's major writings, a complete listing of his acoustic and electroacoustic compositions (up to 1998), and the vast majority of his many other published and unpublished works.

Mr. Tabor's efforts in compiling such a well-organized and much needed study should be strongly applauded; perhaps it will provide impetus for more books of its kind. The varied, insightful, and thought-provoking essays about the many challenging ideas of Mr. Laske, as well as art and art making in general, provide for stimulating and rewarding reading. Along with the appeal to composers, this book will be of great interest to those in cognitive science, computer science, psychology, and philosophy as well. It is highly recommended!

Mark Kahrs and Karlheinz Brandenburg, eds.: Applications of Digital Signal Processing to Audio and Acoustics

Kluwer Academic Publishers, 1998, 545 pages, hardcover, illustrated, bibliography, index, available from Kluwer Academic Publishers, 101 Philip Drive, Norwell, Massachusetts 02061, USA; telephone (781) 871-6600; fax (781) 871-6528; electronic mail kluwer@wkap.com; or Kluwer Academic Publishers, P.O. Box 17, 3300-AA Dordrecht, The

Netherlands; telephone +31 78-639-2392; fax +31 78-639-2254; electronic mail Services@wkap.nl; World Wide Web www.wkap.nl or www.caip.rutgers.edu/~kahrs/books/adspaa.html

Reviewed by Eric D. Scheirer
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Cambridge, Massachussetts, USA

Imagine the ideal application-focused, audio signal-processing book. Such a book would have chapters written by eminent experts in the field. It would cover topics of timely interest that are yet not treated frequently enough in the technical literature. It would be edited and assembled with attention to clear writing, attractive visual appearance, and consistent style. The book would have an extensive bibliography to provide the interested reader sources for further investigation. And, it would be reasonably priced, to be accessible to the industrial researcher, academic, student, or hobbyist alike.

Mark Kahrs and Karlheinz Brandenburg, eminent practioners of the application of signal processing to problems in audio and acoustics, worked intensively for several years with leading technical experts to produce the aptly-named *Applications of Signal Processing to Audio and Acoustics*. It admirably meets all of the above criteria except, unfortunately, the last. I'll return to that concern at the end, first, though, the good news.

Saying this book is an essential addition to any serious audio DSP library does not go nearly far enough. This book is, by itself, a serious audio DSP library! It collects in one place ten review and tutorial papers that, each alone, deserve to become the standard references on their topics for students and practitioners in the field. Initiated during the biannual IEEE <<Doug: do we need the acronym expanded for this? Institute of Electrical and Electronics Engineers>> Workshop on Applications of Signal Processing to Audio and Acoustics (the "Mohonk" workshop, so named for its fixed location at the Mohonk Mountain House in upstate New York), Mr. Kahrs and Mr. Brandenburg assembled key researchers in the field and charged each of them with the delivery of a detailed technical overview of their area of research.

The chapters fall into two categories. The first takes the form of summaries, or reviews, of fields with a great deal of existing scientific background. Chapters in this category include John Beerends on objective measures of perceived audio quality, Mr. Brandenburg on perceptual audio compression, Simon Godsill, Peter Rayner, and Olivier Cappe on digital audio restoration, James Kates on hearing aids, Thomas Quatieri and Robert McAulay on sinusoidal analysis and synthesis, and Julius O. Smith on digital-waveguide implementations of physical models of musical instruments. In these chapters, the authors report and compare the different approaches that make up the fields described.

The second category provides introductions to fields that have previously been less-often discussed in the literature. This category includes chapters by Bill Gardner on reverberation, Mr. Kahrs on the architecture of audio systems, Jean Laroche on time-scale and pitch-scale modification, and Dana Massie on sampling synthesis. In these contributions, the authors have shown a willingness to share the "trade secrets" that are used in the digital audio marketplace but not often reported in the scientific literature.

Each of these categories is valuable in its own way. The first sort of chapter is important because it has previously been very difficult for newcomers to these fields to find a foothold to get started. Each contribution will serve as a valuable introduction for many students and hobbyists. Through the comprehensive bibliography and discussion of the literature each provides, it is much easier to understand the interrelationship of the different papers found in technical journals. The second sort is important because it helps to begin the scientific discourse on a topic. When too much of the research in an area is held "secret" by private companies—particularly true today for the design of sampling synthesizers and artificial reverberators—it is very difficult for academic researchers to study the techniques in principled detail. As a result, the academic research track may lag behind the knowledge possessed implicitly in industry, in some cases by years. These studies help to begin the difficult project of bringing research out into the open for peer-reviewed study and debate.

The book, and each chapter individually, is well-written and authoritative. I would be hard-pressed to think of any way to improve the choice of authors for the topics covered here. The presentation in each case is thorough and exhaustive, impeccably referenced with many citations to the primary literature, and attractively presented with attention to detail. Such is the quality of writing and layout that even at the heft it already presents, I found myself wishing for treatment of other topics that interest me. Topics like filter design for synthesis, audio watermarking, parametric synthesis techniques, pitch and tempo-tracking, and audio indexing and retrieval now stand in great need of high-

quality, up-to-date review and reference articles to complement the topics presented in this volume.

In case it is not clear from the list of topics, this is a very technical book. Just to read and comprehend most of the chapters will require a graduate-level background in digital signal processing theory. A working understanding of all of the concepts in even a single chapter will require weeks or months of intensive engagement with the details. But this is not a criticism—before the appearance of this book, it would likely have taken years to come to terms with the scientific literature on these topics, since most chapters collect material that has never been collected in one place before. Given the baseline set by the book as a whole, I think that the chapters by Mr. Garder, Mr. McAuley & Mr. Quatieri, and Mr. Smith are among the more technical, and the chapters by Mr. Kates, Mr. Kahrs, and Mr. Brandenburg are the least technical, at least in the sense of applied mathematics. The chapters by Mr. Kates, Mr. Beerends, and Mr. Brandenburg additionally require some technical background in psychoacoustics for fullest understanding.

This is not a volume targeted at the working musician or composer. Except for the most technically-minded musician, there is very little material in most chapters that could be directly applied to the compositional process. For those systems-builders (or composers who double as systems-builders) wishing to build musically-sophisticated tools for composers and musicians to use, however, there is no better introduction than this book to the topics it covers.

The only organizational point with which I disagree is the decision to put all references at the end, rather than collecting them by chapter. But this is a very minor point. Not so minor an issue is the price; the book is listed at $145 and is not available at discount as of this writing. Such a price will clearly act as a barrier to the students and hobbyists who would most benefit from the thorough assemblage of material. For example, this book would make an ideal text for an advanced class in musical signal processing, but it would be very difficult for instructors to require purchase of such an expensive book. While the quality and attention to detail in the volume is certainly very high, it still seems difficult to justify this price tag. Perhaps the publisher and editors conceived of it primarily as a reference volume to be purchased by libraries; if so, I think they underestimated the value it has to the music programmer. It would be a shame if the book were not widely used and cited because of the price. I can only hope the cost will come down if the book is reprinted.

In sum, anyone who has an interest in the applications of digital signal processing to problems in musical multimedia, acoustics, or the construction of music-analysis or music-synthesis systems should be aware of this book. Its publication stands as a landmark in the organization of advanced topics in this field of study. If the price tag were not so steep, it would be an immediate recommendation without question. Regardless, I encourage everyone to look it up in a university library, see if it meets your needs, and add it to your personal library if you have the means to do so. If you do, your bookshelf will be improved immeasurably by the addition of this exciting work.

Eduardo Reck Miranda: Computer Sound Synthesis for the Electronic Musician

Focal Press, 1998, 208 pages, softcover/CD-ROM, illustrated, appendices, bibliography, CD-ROM instructions, index, ISBN 0-240-51517-X; available from Focal Press (an imprint of Butterworth-Heinemann), Linacre House, Jordon Hill, Oxford OX2 8DP, UK; telephone (+44-1865) 314627; fax (+44-1865) 314091; electronic mail bhuk.orders@repp.co.uk; or Focal Press, 225 Wildwood Ave., Woburn, Massachussetts 01801-2041, USA

Reviewed by Paschall de Paor
Limerick, Ireland

This book is one of several published by Focal Press in its Music Technology Series (Francis Rumsey, ed.). It is targeted primarily for university and college courses in the field and working professionals seeking to update or expand their knowledge (as stated in the preface). This review is based on that stated objective.

The book is divided into eight chapters, with two appendices, references, index, and instructions for using the CD-ROM. It discusses several synthesis techniques, provides examples for implementation, and outlines how to construct one's own instruments.

The preface is, as one would expect, an overview of the book, with some tantalizing information on each chapter. However, some details are unnecessary here (for instance, stating Fourier's theorem), and some need clearer explanation (the author states that additive synthesis is "expensive" to run—on page x and later on page 125—meaning in computational and not financial terms). Plainly obvious to the experienced reader but not to the novice, assumptions or interpretations of this kind need to be explained more fully.

In chapter 1, "Computer Sound Synthesis Fundamentals," Mr. Miranda consigns the initial two small paragraphs to explaining the fundamental behavior of sound and the recording chain. This is really not enough—it assumes a greater knowledge on behalf of the reader than is stated at the outset. And some of the explanations, in their simplicity, will lead to fundamental misunderstandings by the reader (such as the basic explanation of an analog synthesizer). Other topics also contain potential for misunderstanding; for example, the statement that an "analog oscillator produces only a sinusoidal waveform" (page 14). Perhaps the earliest examples did, but this is clearly no longer the case! Furthermore, some argumentative factual errors are present: "[the] first programming language specifically designed for sound synthesis was Music III" (page 8). Music I was specifically designed for sound synthesis. Music III was the first to include unit generators (UGs) and the ability to patch these together to form a network for synthesis. A small detail, perhaps, but again, the intended reader will pick up on such things (certainly, I would wonder about Music I and II). And, of course, the book is about synthesis, so therefore one expects details on the subject itself to be accurate. One may state that Music III was the first of its kind, but it must be contextualized, and in this case it was not. It is another example of a well-intentioned, but inaccurate statement of fact. I also wonder about the order of information presented. For example, the sampling theorem and quantization noise precedes Nyquist information. The series editor (Mr. Rumsey) handles these and other related topics excellently in his own book (*Sound and Recording: An Introduction*, 2nd edition, 1994), and includes much-needed graphical examples and explanations. Finally, other smaller problems, no less important to a student, include spelling (Herz instead of Hertz, etc.).

Chapter 2 deals with the software on the accompanying CD-ROM, and in enough detail to enable the reader to effectively use it. However, one must consider the prudence of placing this so early. Clearly the author wishes the readers to be sufficiently familiar with the software to enable them to work through the provided examples. This is understandable and generally a good idea. However, it does interrupt the flow of the book. It could easily have lived in an appendix, with instructions at the beginning, to allow the reader work through it if he or she wishes to make use of the examples (giving the readers a choice). In Mr. Miranda's case, they do not have this choice: skipping chapters is not a valid option. Furthermore, having just covered the fundamentals of sound synthesis, the reader is launched into an explanation of software operation and functionality, introducing terminology and techniques not yet covered. This could lead to confusion.

In chapter 3, "Loose Modeling Techniques," Mr. Miranda for some reason devises a taxonomy of sound-synthesis techniques. However, I am not sure this is the place to do it. Subjects such as AM, FM, waveshaping, wavetable, Walsh function synthesis, and Binary synthesis are classified as *loose modeling*. Further research by the reader will not return many references to this term, and consequently it opens the possibility for confusion. A very useful element here, though, is the inclusion of examples using the accompanying software.

In chapter 4, "Physical Modeling Techniques," Mr. Miranda rightly points out that his inclusion of some techniques in this section might cause controversy. There exists a legitimate argument for including subtractive synthesis, but this is really not the place to do it. An introductory text such as this should be devoid of such contentious issues.

One of the main tenants of computer music and sound synthesis is Fourier analysis/synthesis. After skipping through it in chapter 5 ("Time-Modeling Techniques"), Mr. Miranda comes back to it in chapter 6 ("Spectral Modeling Techniques"), which is the right place to do it. However, additive synthesis is generally one of the first synthesis methods used to initiate novices into the field of sound synthesis; it involves the use of Fourier analysis and is easily understood. Mr. Miranda leaves additive synthesis quite late in the book, for no apparent reason, thus depriving the reader of a gentle introduction as opposed to a jolting one.

In chapter 7, "Instrument and Sound Design," Mr. Miranda seems to disparage a "highly irrational approach to sound design" (page 148) by suggesting one should base new instruments on well-documented acoustic theories. This is acceptable only if used in the initial stages of learning. After all, one of the key enticements and powerful applications of sound synthesis (and stated as such elsewhere by the author) is the ability to use any source of information for synthesis parameters. However, the author states closely thereafter that these new instruments should serve as a "point of departure," so it is a small detail, but one that could shape how a reader perceives instrument design. The inclusion of a detailed working example (based here on formant synthesis using a subtractive technique) is excellent, but might have been even better if some further experiments were also included (for example, encouraging the reader to try adding another formant here, a different number there, and so on).

In the final chapter, "Towards the Cutting Edge", the author's research area (artificial intelligence and sound synthesis) is clearly demonstrated. Also covered are parallel computing and its ramifications for synthesis. Both of these are very useful additions, and add considerably to the value of this book.

The choice of software on the CD-ROM is ultimately the author's choice, and he strikes a good balance between the two platforms his target audience will probably use (Macintosh and PC). There is much else available, but this set should give the reader a good indication of the possibilities.

An area too often overlooked is the music, and there is no discography included. Mr. Miranda rightly states that "the art of sound synthesis is as important for the electronic musician as the art of orchestration is for composers of symphonic music" (though why he chose "musician" instead of "composer" for the electronic field remains to be discovered). However, actually hearing examples of certain synthesis techniques is extremely valuable, not least because it demonstrates application and musical context, which can help toward choosing an appropriate technique and confirming theory with practice. Even a small list would have sufficed. However, there are several musical references in the book which should allow the committed reader to more fully explore synthesis applications and musical consequences.

This type of book should provide pointers to other information. Moreover, one expects any tome which purports to "introduce computer sound-synthesis techniques and synthesis programming to students, researchers, musicians, and enthusiasts" to include reference to some, if not all, of the standard texts in the field. Here, this is not the case. One of the most significant (and widely used) books in the field is missing—*Computer Music*, by Charles Dodge and Thomas Jerse, is certainly still extremely relevant (in its second edition)—yet Mr. Miranda chose not to include it. Another notable absentee is Curtis Roads's *Computer Music Tutorial*, also highly relevant to the target reader.

One of the biggest disappointments with this book is the absence of a conclusion or summary chapter, uniting the various strands. With such a vast array of techniques and information presented, there is clearly a need to sum up all that has gone before. The reader suddenly finds him or herself at the end, without any sort of summation. This further detracts from the usefulness of the book for its stated purpose.

The absence of Csound is notable. Such an introductory text could certainly have included the most widely used, understood, referenced, and freely available synthesis engine out there. Practically all the synthesis techniques discussed in the book are available in Csound, and it runs on a wide range of platforms. Mr. Miranda deems it unimportant in absentia, and this, of course, is his prerogative. To be fair, there are two references to Csound in the sections on parallel programming and on the Composer's Desktop Project (CDP). The basis of Csound, the so-called Music N languages, is discussed via PCMusic (though the student will find little reference to this in the general music technology literature). A positive point, however, is the discussion of CDP. This very important project is too often overlooked, and Mr. Miranda gives it credible coverage.

There are so many bumps in the information and its presentation that I find the book to be uneven. Certainly, it is a useful addition to the repertoire, especially the artificial intelligence section, but its inconsistencies detract from its ability to serve as a good introduction; it really needs to be used in conjunction with another text. There is no question but that Mr. Miranda knows his sound synthesis, and this is obvious to an experienced reader. However, he does not know how to communicate this clearly enough, which is unfortunate, as he has a lot to offer and his book has so much potential.

Recordings

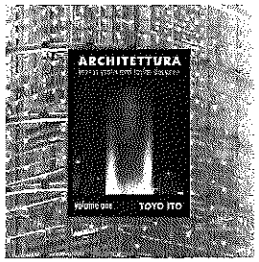
Caipirinha Music Architettura Series: Vol. 1 Savvas Ysatis and Taylor Deupree: Tower of Winds; Vol. 2 Tetsu Inoue: Waterloo Terminal; Vol. 3 David Toop: Museum of Fruit

Compact discs, 1998/1999, Caipirinha Music cai2007 (vol. 1), cai2016 (vol. 2), cai2022 (vol. 3); available from Caipirinha Music, 1120 Fifth Ave., No. 15A, New York, New York 10128, USA; telephone (212) 410-5117; fax (212) 987-8940; electronic mail caipirinha@caipirinha.com; World Wide Web www.caipirinha.com

Reviewed by Kim Cascone
Pacifica, California, USA

Architecture is frozen music.
—Madame de Stael

There seems to have always been an aesthetic connection between architecture and music/sound. Pythagoras claimed he could "hear" structured space and proportion; medieval court musicians filled open space with live music; and Gregorian singers likewise filled reverberant cathedral spaces with their chanting voices. Elevator music keeps people relaxed in a confined space and, currently, we are sonifying architectural constructs in cyberspace. It is apparent that throughout history humans have spent a great deal of energy mapping sound onto architectural spaces. Conversely, many examples exist of composers using number systems such as the golden rule and the Fibonacci series, both well known for their applications in architecture. A good example of this type of data exchange is the work of



transarchitect Marcos Novak (http://www.cda.ucla.edu/Pages/novak.html), who has built time-variant post-Euclidean virtual structures from audio data. The computer has liberated data from being confined to separate containers, and we are now able to explore worlds of space and audio that had previously been thought unreachable.

Caipirihna Productions has created an interesting series of releases that focus on the more poetic relationship between music and architecture. Rather than being direct mathematical mappings of sound to space, the series describes a more fluid relationship where the music is inspired by the space it is intended to represent.

Tower of Winds, by Savvas Ysatis and Taylor Deupree, is the first release in the series, and is based on a sculptural tower designed by architect Toyo Ito. The structure is set in a roundabout near the Yokohama Train Station, Japan. The tower is not really a building per se, but a structure that "reacts" to its environment by illuminating itself via computer-controlled lighting. The computer "listens" to the ambient environment and interprets wind speed, direction, and time of day, using the information to control the lighting of over 1,280 lamps, a dozen neon lights, and 30 floodlights set around its perimeter. The patterns that emerge from the interaction with its environment portray "small-scale changes, the temporary minute, and the chance encounter as what defines the city." The architectural structure, therefore, doesn't perform the function of being an "inhabited space," but is an indicator of ambient noise and wind patterns. The structure mirrors small-scale activities of the environment such as traffic lights, vending machines, and illuminated advertisements which, in Mr Ito's aesthetic, defines the city more than its buildings do. The music on the *Tower of Winds* disc has a similar slow-moving, pattern-based language woven into its fabric. Intricate patterns float in and out over large sheets of ambient textures, mirroring the activity of the Tower's lights as dusk approaches in Yokohama. Small flickers and stuttering sounds jut out in angular forms that could be construed as the haphazard timing of human activity centered around a train station—driving, bicycling, walking, buying, eating, talking, crossing the street, looking out of windows, hailing taxis, asking for directions, saying goodbye.... All of this is punctuated by the patterns of light that are ingesting this activity and tossing it back out into the environment where people subliminally tie their actions to it. The music combines rhythms that could be found by walking or driving; it also reflects the time of day. Some of the eleven pieces on the CD reflect the world of the invisible: the squelchy patterns that, though hidden from view, aurally reflect the activity of the city.

The second release in the series is *Waterloo Terminal* by Tetsu Inoue, inspired by the Channel Tunnel Terminal at Waterloo Station in London. The "chunnel" terminal, designed by Nicolas Grimshaw and partners, is described as "the first monument of a new railway age," and is stunning in its intricate play of light and reflective surfaces. The terminal is an addition to the original station, and contrasts the older part by slithering through the urban decay like a silver snake making its escape toward the channel. Mr. Tetsu's work on this disc performs a similar action of reflecting glints of light and slithering through the digital detritus in snake-like movements. Using over 1,000 pictures of the terminal that were scanned into his computer, he extracted both form and texture from the photos (using the software Metasynth) and used them in the intricate design of his piece. Swatches of static, hum, and stuttering clips of unrecognizable music ebb and flow in the shiny sonic skin that plays tricks with shadow and light. These ruptured textures and stabs of static match the perfect fragmentation that the architecture proposes. This release charts similar territory as the stuttering, broken-tech work of Oval and Microstoria, but instills a quality of organic movement that takes the style further.

Today, utopia can only be realised in fictional form.
—Itsuko Hasegawa

The third in this series is *Museum of Fruit* by David Toop, well known for his oneiric book chronicling the arc of ambient music, *Ocean of Sound*. This disc is based on the work of female architect Itsuko Hasegawa, who designed a curious set of structures dedicated to fruit. "Located in Yamanashi, Japan, within sight of Mount Fuji, the Museum of Fruit is a cluster of three domes—a tropical green house, an atrium event space, an educational workshop for teaching—built on a gentle slope." The photographs that accompany the CD are quite beautiful, evoking the presence of the buildings and the context in which they exist. They have a somewhat similar appearance to an environment found in an episode of *Star Trek*: alien, intelligent structures tossed down like seeds into serene natural surroundings. There is a feminine feeling to the structures, and likewise, Mr. Toop's music evokes a yin experience, where enveloping space is the predominant element. Open space, moody yet serene. The composer mixes the electronic sounds of Theremin and bio-electric recordings with the wafting, airy sounds of flutes and steel guitar. Some of the textures conjure Miles Davis's more somber, spooky electronic work, with low drones weaving in and out of shadows, twittering wah-wah guitars, and slow-motion, gong-like percussion. Other textures are reminiscent of Iannis Xenakis's work (in particular, *Smell of Human Life*). All of the tracks on this fine recording induce a mesmeric state in the listener, an appropriate mental state for visiting an environment such as the Museum of Fruit. Mr. Toop is a master of deep atmospheric explorations, and that is evidenced here in each of the eight pieces.

The Caipirinha Architeturra series has been a pleasure to become acquainted with, since I have a fascination with architecture and it often becomes the inspiration for my own sound work. There are more releases planned for the series, and I am waiting eagerly to hear more of the architecture that artists are inspired by. Very highly recommended.

CDCM Computer Music Series, Vol. 28: Larry Austin: SoundPlays, Cityscapes, SoundPortraits—1993–96

Compact disc, 1999, Centaur CRC 2428; available from CDCM, P.O. Box 50888, Denton, Texas 76206, USA; telephone (940) 591-8128; electronic mail cdcm@sndart.cemi.unt.edu; World Wide Web www.music.unt.edu/CDCM/newedcat.html#28

Reviewed by Philip Baczewski
Denton, Texas, USA

Volume 28 of this series from the Consortium to Distribute Computer Music (CDCM) is the eighth release categorized as The Composer in the Computer Age. The composer in this case is Larry Austin, well known in computer music circles and the producer and cofounder of the CDCM series. This 1999 release presents three contrasting works which are bound together in a cohesive statement by Mr. Austin's pervasive aesthetic and mastery of his genre.

The disc is entitled *SoundPlays. Cityscapes. SoundPortraits—1993-96*. The music presents a fabric woven from text, context, and

historical reference, exploring human language and jazz language, creating distinct sonic environments, and melding past and present. *SoundPlays* is specifically *Variations...beyond Pierrot*, scored for a "Pierrot" ensemble and written for the Canadian group, Thira. Following it is *Shin-Edo: CityscapeSet*, a five-movement computer music reflection of Tokyo. Completing the CD is *BluesAx*, written for saxophonist Steven Duke and for which Mr. Austin was awarded the 1996 Magisterium in the 23rd International Electroacoustic Music Competition in Bourges. Altogether, the music on this recording ranges from solidly classic to definitively jazz with a bit of "in between."

Variations...beyond Pierrot is aptly titled. While drawing upon Arnold Schoenberg's 20th-century classic, these *Variations* are reflective of their inspiration, but not duplicative. This commission prompted Mr. Austin to re-examine a work which he admits was influential in his own musical development. The result, while closely mapped to *Pierrot lunaire*, builds upon the original work's concept. Such historical reflection is not unprecedented in Mr. Austin's catalog. His realization of Charles Ives's *Universe Symphony* (1974–1993) from Ives's sketches and his *Sinfonia Concertante: A Mozartean Episode* (1986) reflect his interest in exploring and reinterpreting his musical forebears.

Variations extends the dramatic context of its model. Mr. Austin's work is intended to be theatrical in live performance, including costuming, stage direction, dramatic interaction of the players, and theatrical lighting. A glimpse of the setting can be seen on the disc's cover, which overlays photos from Thira's performance onto a photo of the front of a Japanese kabuki theater (a very nice cover design by Lou Harrison of the North Carolina State University Graphics Lab). The piece does not suffer, however, in the recorded medium. The drama of the work is conveyed through Mr. Austin's combination of vocal, instrumental, and computer music, with an emphasis on text provided by the computer music track, which presents the set poems in four languages (English, French, German, and Japanese). The computer-processed readings are also a player in the drama. Through gentle manipulations and spatial orientation, the computer music becomes a lively presence in this musical milieu.

To form his *Variations*, Mr. Austin selected lines from 20 of the original 21 poems set by Schoenberg (for philosophical and aesthetic reasons, he chose not to set "Red Mass"). He has set the refrains from the rondels as well as additional text he selected and adapted. The result evokes the original, but also provides the composer with his own palette from which to base his sound-play. In a conversation with the composer, he described the process by which he also mapped the original instrumental textures onto his variations. This process influenced the creation of "moon scores" (pun intended) for the players, consisting of concentric ellipses of musical staves containing precomposed gestures from which they freely constructed their performance. Like its model, *Variations* is in three parts, with the computer-mediated recitations providing the focus for coordinating the performance.

I found *Variations* to be an intriguing and evocative work. It is excellently performed on this CD. The piece prompted me to revisit *Pierrot Lunaire*, an interesting encounter, since my more mature and experienced ears immediately grasped Schoenberg's work with an understanding that was not yet present in my academic exposure to the piece at a much earlier age. Mr. Austin's composition is a fascinating late 20th-century reflection of this pivotal early 20th-century work.

Shin-edo: CityscapeSet stands in marked contrast to the preceding piece. It is a computer music sound poem in five movements, drawn from Mr. Austin's experiences while in residence at the Kunitachi College of Music's sonology department in Japan. *Shin-Edo*, a term apparently coined by Mr. Austin to mean "new-inlet," presents the rich sonic landscape experienced by the composer while residing in an unfamiliar city. To those of us who regularly stop in our tracks, risking the askance stares of passers-by, transfixed by some unique combination of environmental acoustics, this music is a decided treat. These tracks are best listened to in a good stereo environment or, better yet, with a quality set of headphones. My first listening was less than ideal, but I was still impressed with the sound portrait painted by this work. A second listening with headphones immersed me in its sonic landscape.

My personal favorites from this set are *Rikugien Garden* and *"Tamagawa-josui desu."* The former (movement 2) is a subtle depiction of falling rain with the muted calls of birds making their way through the foreground veil of water. It is the audible equivalent of stepping into a Monet painting. *"Tamagawa-josui desu"* is a quite different but equally compelling sound journey. It is Mr. Austin's 40-min train-ride from his apartment to Kunitachi College, condensed into a 7.5-min sketch. The use of movement through the stereo space is notable, placing the listener in the midst of speeding trains and busy stations. It is the composer's interpretation of this journey that makes it interesting, combining recurring train ostinati with episodes of tranquil repose.

Computer tape works are not a rarity among Mr. Austin's output, but he has shown a definite inclination to write for live performers and tape. *Shin-Edo* is a nice addition to his "solo" catalog. Its text is the living sounds of a vibrant city and it provides a fitting counterpoint to the instrumental compositions that frame it.

BluesAx is perhaps the best known of the three works on this CD. It has received many live performances, understandably because of its award-winning status and its inclusion in Mr. Duke's repertoire. With *BluesAx*, Mr. Austin revisits his own history and reveals his deep appreciation for jazz. In 1947, he was one of the first to participate in the by-now internationally famous Jazz Studies program at what is now the University of North Texas. His affinity for jazz has surfaced in compositions such as *Homecoming: A Cantata for Soprano and Jazz* (1958–1959) and *Improvisations for Orchestra and Jazz Soloists* (1961) (recorded on *Leonard Bernstein Conducts Music of Our Time*, 1965, New York Philharmonic, Columbia Masterworks, MS6733).

BluesAx features four of what Mr. Austin has labeled as "interpretive sound portraits" of jazz saxophonists Sidney Bechet, John Coltrane, Johnny Hodges, and Charlie Parker. In a conversation with the composer, he described the day-long recording session that provided the source material for the computer music part, where he asked Mr. Duke to improvise in the style of those jazz greats. Also included in that session were improvisations by Mr. Duke in his own style, and these serve as the basis for the three interludes that separate the interpretative portraits. The score to *BluesAx* presents meticulous transcriptions of these improvisations as source materials to be interpreted by the performer in coordination with the computer music tape. In live performance, digital delay and reverb affects are applied to the saxophone part as it is amplified and mixed with the tape part.

The result, as performed by Mr. Duke, is a work that would be equally at home in a concert hall or a jazz club. The effect is not of an opposition of live performer and prerecorded tape, but a blending and interaction of a chorus of saxophones. This is punctuated by a BBC-recorded Kenyan rainforest and lakeside sounds, London and New York street sounds, and samples from the New Orleans Heritage Festival. The composer has provided an environmental context for the jazz references, from hints at jazz's origins in *I. BluesInCameroon* to the musical pun of Kenyan birdcalls in *VII. BluesOutParker*.

The majority of work on these pieces was apparently done at the composer's Denton, Texas studio using Csound, Cmix, and Rt (for *Variations* and *Shin-Edo*) on a NeXT computer. The high-quality recording of the live performances deserves special note. David Rosenblad of Dallas Sound Lab has done excellent work engineering both *Variations* and *BluesAx*. Given the superlative performances and excellent audio quality of this disc, it is an outstanding representation of computer music art.

Alessandro Cipriani and Stefano Taglietti: Il Pensiero Magmatico

Compact disc, 1998, EDIPAN CD 3059; available from Edizioni Musicali EDIPAN, Viale Mazzini 6, 00195 Rome, Italy; telephone (+39-6) 322-3474

Reviewed by alcides lanza
Montreal, Quebec, Canada

Il Pensiero Magmatico (Magmatic thought), for tape, piano, percussion, and mixed choir, was created jointly by Alessandro Cipriani and Stefano Taglietti. The subtitle reads: "and 33 reflections of the vagabond dragon on life taken (for granted) to be eternal." This primal magmatic thought transcends temporality. Within this time continuum, the musical phrases are enticing and evoke rich imagery. At the same time, the plain, spoken voices bring things to earth and to the present. In a way, we perceive that as a contradiction.

Some common techniques used are effective, like echoes and close canonic imitations. However, it is hard to remain enchanted with the magic of this sonic imaginary gar-

den when the speaking voices have mostly prosaic contributions.

The piano and percussion establish clear temporal markings, with intriguing sonorities, long decays and extended envelopes. Some key words are stretched using computer techniques and granular synthesis. The choral components are precise and done with dexterity.

After the slow introductory music on track 6, the choral setting that follows is delightful, creating mysterious sonorities of an eerie character. Semantic understanding is at a minimum in this section. The guttural and fragmented vocal utterances create rich strata of vocal colors, well matched by the instrumental and recorded sounds. But, the magic spell is broken by the staid delivery of the parlato male voice. The granular synthesis and other digital processors used are welcome enhancements to the solo voice, though. The sustained choral harmonies present in track 8 are beautiful by themselves, as if suspended in time.

The poetry is by Bizhan Bassiri. Some sections of the text are easy to follow and understand. At other times, the tape part and signal-processing manipulation melt the spoken text into the general texture. The sense of lyricism is maintained, as is the evolution toward tragic moments. Key words—*orrore* (horror), *veleno* (poison)—bring matters more into the realm of an ancient tragedy. In their writing for piano and percussion, Mr. Cipriani and Mr. Taglietti are quite successful: the solo and ensemble moments blend well with the choral sections.

There is a certain lack of temporality and a duality of vision in this work that seems to reach to an unclear future or a ghostly past. It incorporates poetry and music, and elicits visual imagery. Are we touched by this vagabond dragon's tongue? It all depends on our imagination.

Credit is given to the Coro Aureliano, conducted by Bruna Liguori Valenti, and to Alessandro Tomassetti, percussion, and Stefano Taglietti, piano. Mr. Cipriani created the sound treatments and produced the final mix.

The Residents: Wormwood: Curious Stories from the Bible

Compact disc, 1998, East Side Digital, ESD 81332; available from East Side Digital, 530 North 3rd St., Minneapolis, Minnesota 55401, USA; telephone (612) 375-0233; fax (612) 375-9580; electronic mail esd@noside.com; World Wide Web www.noside.com/esd/

Reviewed by James "Eye" Harley Moorhead, Minnesota, USA

The Residents released their first recording on their own label, Ralph Records, in 1972. *Santa Dog* is certainly one of the stranger contributions to the realm of electroacoustics (or popular music, for that matter), followed by *The Third Reich 'n Roll* (1976), a pop-music deconstruction *par excellence*. Here was a group—a band, if you will—steeped in the vernacular music of the time (Captain Beefheart being one of the most obvious of many influences), who had creative and commercial aspirations but who were evidently limited in performance abilities. Instead of jumping up on stage, they invested in studio equipment. Those early releases are occasionally rough (or even more than occasionally), almost always extremely bizarre, but the satirical genius and talent for combining sonorities is immediately apparent. While the orientation is clearly pop, the music is also worthy of consideration as an original approach to studio composition.

Over the succeeding decades, the Residents not only thrived (within the limits of marginal independent artists, unaffiliated with any major institutions or record labels), they got good at what they were doing. One of the first E-mu Emulators was shipped to their studio, and they have gone on to build up a digital studio capable of producing high-quality music and interactive media (*Bad Day at the Midway*, from 1995, is an award-winning CD-ROM cast in the form of a subversive video game). They have even been featured as part of Apple Computer's Think Different campaign (http://www.apple.com/publishing/music/residents/)!

This latest album, then, is a sophisticated, assured piece of work. *Wormwood* takes its point of departure (and most of the lyrics) from the Bible. Like virtually all of the Residents' output, the attraction here is the "dark" side of the Good Book, the "curious stories" that are found scattered throughout. So, we find songs about Salome (*How to Get a Head*), Sodom and Gomorrah (*Fire Fall*), Jeremiah (*Mr. Misery*), Cain and Abel, and so on. Most of the music is produced by means of sequencers and samplers, along with vocals and the occasional burst of electric guitar. After a number of albums of relatively cheesy synthesizer sounds, this one is positively orchestral. The sonic definition is of the highest quality, and the timbral range is wide enough to hold the listener's interest even without following the lyrics. They actually brought a gamelan into the studio, adding those beautiful metallic pulsations to *Bathsheba Bathes* and *Seven Ugly Cows*. All of the tracks fall into the song format, with clear structures and regular beats, though often with an intricate mix of timbres and rhythms. The two instrumental selections that frame the disc, *In the Beginning* and *Revelation*, are less constrained in style, and as a result are the most interesting, from the sonic perspective. The opening is full of nasty snarls and thunder, setting the mood.

This, it must be said, is no longer music of the avant-garde or "idiot-savant" originality. It is a well-produced, interesting, occasionally catchy set of tunes. The voices are clearly lacking in glitz—the tone is more like Tom Waits in a bad mood—though the female singer (not clearly named in the liner notes—oh, did I mention? The identities of the members of the Residents are protected) would not be out of place on Broadway (or perhaps off-Broadway). But, nothing controversial here except the subject matter, and my impression is that even here the Residents are perhaps trying too hard to hit the counterculture button. There were some sporadic protests during their recent tour from Christian groups, but few people are going to argue that there are episodes of sex and violence in the Bible. The need to include a defense of the choice of material in the liner notes exemplifies the shift from the in-your-face attitude of their early years to the more professional orientation of today. For better or worse, the Residents have reached middle age!

The live show, recently touring throughout North America and Europe, was quite different than the album. The wide range of sonorities on the recording were given over to a rock format, with electric guitar, keyboard, bass, and drums. The order of songs was also different, grouped into related themes, leading me to wish they could have developed a more integrated, theatrical presentation. There were a few props, lights, and effects, but essentially, the male and female singers traipsed out one after another, sang their songs, then moved off again. A good show, but a wasted opportunity, I thought. Of course, one must keep in mind that the Residents have no giant promoters behind them. Essentially, they are their own producers, promoters, and performers (see http://ralphamerica.com/).

Wormwood is a far cry from almost anything you will see on MTV; don't get me wrong. For sequenced, MIDI sampler-based music, this is an impressive album. But it's also a stretch from the hard-hitting musical satire of the Residents' early days.

Multimedia

Alvin Lucier: 40 Rooms

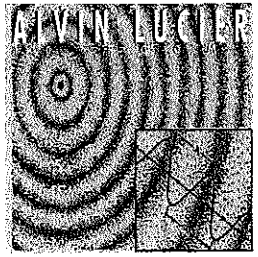
CD-ROM, 1998, iEAR Studios, Rensselaer Polytechnic Institute, Troy, New York, USA; available from Electronic Music Foundation, 116 North Lake Ave., Albany, New York 12206, USA; telephone (518) 434-4110; fax (518) 434-0308; electronic mail cde@emf.org; World Wide Web www.cdemusic.org/

Reviewed by Ann Warde Oneonta, New York, USA

The cat is back!

> I am sitting in a room different from the one you are in now. I am recording the sound of my speaking voice and I am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed. What you will hear, then, are the natural resonant frequencies of the room articulated by speech. I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have.
>
> —Alvin Lucier

Thirty years ago, Alvin Lucier caused this statement to slip (as Nicolas Collins has noted) "from the domain of language to that of harmony" by purposefully revealing the acoustical characteristics of a room. Subsequently, Mr. Lucier's probing and peeking with acoustical magnifying glasses and sonic microscopes has continued to invite us to



listen to music that *is*. In his cajoling, he overlooks our desire to be passive soakers-up of our audible soundscape, and lures us into joining his search for hitherto hidden musical realities.

The score of *I Am Sitting in a Room* specifies precisely how to achieve what the speaker has just described, and then concludes with, "Continue this process through many generations....Make versions in which one recorded statement is recycled through many rooms. Make versions using one or more speakers of different languages in different rooms. Make versions in which, for each generation, the microphone is moved to different parts of the room or rooms. Make versions that can be performed in real time."

Following his own good advice, Mr. Lucier has given us (in this CD-ROM, for Macintosh PowerPC computers only) realizations of almost all of these versions. In addition, we also find slices of the realities of his own life placed within a set of virtual living rooms, concert rooms, music-composing rooms, conversation rooms, control rooms, exhibit rooms, classrooms, and (to draw from an ancestor of the word "room," *rewe*, the open land) the rooms upon rooms of the rural landscape itself.

Mr. Lucier's written description of his composition *40 Rooms* is as follows: "A Lexicon Acoustic Reverberance Enhancement System (LARES) is programmed to simulate forty rooms of various sizes. During the course of the performance, the players inhabit this electronic architecture, articulating the reverberation time and resonant characteristics of each room." The CD-ROM contains both a segment devoted to *40 Rooms* and a segment devoted to the history of Alvin Lucier. A simple interface of black-and-white cubes on white-and-black backgrounds, designed by producer Johnny deKam at iEAR Studios, makes reference by its geometry to *40 Rooms* and by its simplicity to Mr. Lucier's consistent focus on essentials.

The *40 Rooms* composition offers the observer several choices. We may peer into a rehearsal, or attend a concert featuring *40 Rooms* led by Mr. Lucier featuring performers from the Barton Workshop ensemble (codirected by James Fulkerson and Nicolas Collins). Or we may listen to and watch the composer talk about his compositional methods and ideas. Technical documents describe the LARES itself, which works by generating "time-variant energy" to alter the acoustical characteristics of the space in which it is installed. Also included are movie clips of the setup and testing of this system, and discussion by acoustic architect Chris Jaffe about Mr. Lucier's approach to working with the LARES.

The composition begins by highlighting the acoustical characteristics of variously sized and shaped spaces. Sonic aggregates (for performers of cello, violin, double bass, clarinet, and trombone) were composed by Mr. Lucier in response to the resonant frequencies of each virtual room. The acoustical perception of space, which is a focus of this composition, evokes his earlier work, *Vespers*, in which performers explore a dimly lighted space with echolocation devices. The *40 Rooms* piece takes its listeners on a virtual acoustical tour of five contrasting architectures. One by one, we step into sets of different rooms within each architecture in an illusory exploration of how each functions as a musical instrument. During the last two sections of the composition, Mr. Lucier uses the LARES system itself as an electronic sound-generating instrument, and thus concludes the tour by bringing us out of illusion and into reality. The system no longer simply imitates the acoustical responses of specific spaces. In these sections, it contributes its own audible response (generated by the suppression of feedback) to the room in which it is being performed. "It's as if room size becomes sound."

Mr. Lucier's entire personal archive was available for this project, and because of this, the history segment has a wonderful collection of scores, diary segments, photos, audio excerpts, and QuickTime movie clips of a number of Alvin Lucier's earlier works, including *Chambers*, *Clocker*, *Music for Solo Performer*, *Music on a Long Thin Wire*, *Sferics*, *The Queen of the South*, *Q*, *Music for Pure Waves, Bass Drums, and Acoustic Pendulums*, *Sound on Paper*, and *I Am Sitting in a Room*. In addition, it includes an interview with the composer by Donna McCabe, and a reference section that contains a photo archive, a complete interview transcript, a discography, links to Web resources, and a complete list of works.

Erich Neuwirth: Musical Temperaments (translated by Rita Steblin)

CD-ROM (for Windows/NT) and text, Springer-Verlag, 1997, 70 pages, softcover, illustrated, tables, operating instructions, glossary, ISBN 3-211-83040-5; available from Springer-Verlag, Sachsenplatz 4–6, Postfach 89, A-1201 Vienna, Austria; telephone (+43-1) 330-24-15; fax (+43-1) 330-24-26; electronic mail books@springer.at; World Wide Web www.springer.at/springer.py?Page=30&Key=627&id=358&cat=3

Reviewed by Colby Leider
Princeton, New Jersey, USA

Erich Neuwirth's *Musical Temperaments* is one of several recently published books on the subject of tuning. Others include William Sethares's *Tuning, Timbre, Spectrum, Scale* (Springer, 1998) and W. A. Matthieu's textbook *Harmonic Experience* (Inner Traditions, 1997). *Musical Temperaments* consists of a CD-ROM with an interactive program that enables the user to explore four tuning systems: simple just intonation, Pythagorean, meantone, and twelve-tone equal temperament. The accompanying book is simply a printed version of the hypertext on the CD-ROM, and, according to the author, "serves...merely as a parallel study aid." The CD-ROM won the 1996 European Academic Software Award.

Musical Temperaments presents the user with a hypertext environment with navigation buttons for traversing the material. The text design is clear and simple, and it is generally easy to navigate. The material is divided into three sections: Introduction and Fundamental Properties, Tuning Systems and Frequencies, and appendices. The first section presents the basic arithmetic procedures used in working with scales, intervals, and ratios. The second section is subdivided into systematic explorations of the selected four tuning systems mentioned above. For each, the diatonic scale on C is logically motivated using simple constraints, followed by a discussion of the resultant effects on intervals and triads within that system. Throughout the hypertext, graphical representations of a one-octave piano keyboard are shown, and the user may "play" white notes on the keyboard in various tuning systems by clicking on them with the mouse. Unfortunately, most of the sound samples (all of which are a homogeneous synthesized sound) contain an audible click at the end, and sometimes at the beginning of the sample as well. The appendix summarizes information presented in the preceding sections, and includes tables of ratios used in each of the four tuning systems discussed. A short glossary is also included.

Although Springer-Verlag is to be commended for publishing another book on tuning, Mr. Neuwirth's book/CD-ROM is not without its faults. Unlike the books by Mr. Sethares and Mr. Matthieu, *Musical Temperaments* has no clear target audience. The only academic audience for which it would be of value would perhaps be students in an introductory music-theory sequence, in which case it could be incorporated either at the beginning or the end of the course. A course on tuning and musical acoustics, however, would find the book too brief and simplistic.

Even though *Musical Temperaments* is intentionally restricted in scope, its overwhelming negative feature is its twelve-tone—or rather, diatonic—bias. It would not have been beyond its scope to derive chromatic pitches in each of the presented tuning systems and to discuss non-twelve-tone divisions of the octave. A particularly telling instance of this bias occurs on page 11 in the book, when the author is discussing just intonation: "Unfortunately, this does not function as well as one would like it to." He is attempting to motivate the transpositional "limitations" of just intonation as a segue into a discussion about equal temperament, but such a blanket generalization of how well just intonation "functions" without reference to musical context is simply uninformed.

A more startling problem is the lack of musical examples. The only audio examples on the CD-ROM consist of scales and intervals in the four tuning systems, with the exception of a short synthesized excerpt from the C-major prelude of Bach's *Well-Tempered Clavier, Book One*. Hopefully, a future edition will exploit its medium more fully and offer at least a few compositional examples in various tunings. Furthermore, since the author has chosen to distribute *Musical Temperaments* on a CD-ROM rather than on the World Wide Web, it should compel a more immediate sense of interaction than might be possible to accomplish on the Internet.

Textual problems occasionally obscure what the author attempts to convey. For example, consider the following, which appears on page 23 in the book: "It is obvious that not all of the seconds (or, in other words, whole tones) that occur in pure tuning are equal. By whole tone we mean of course a second."

Musical Temperaments is a concise, generally clear explanation of diatonic scales in four historically important tuning systems. As a brief introduction into the world of tuning, it serves its purpose and fills

a needed gap in the literature. The ambitious, however, would do well to look elsewhere.

CyberQuilt: An ICMA CD-ROM Anthology

CD-ROM (for Macintosh), 1999, ICMA CDR001; available from International Computer Music Association, 2040 Polk St., Suite 330, San Francisco, California 94109, USA; telephone (650) 493-9448; fax (650) 493-8045; electronic mail ICMA@email.sjsu.edu; World Wide Web music.dartmouth.edu/~icma/

Reviewed by James Bohn
North Dartmouth, Massachusetts, USA

CyberQuilt is a CD-ROM anthology put out by the International Computer Music Association (ICMA), curated by Brenda Hutchinson. The disc contains nine works that are roughly split between humorous and staid, with some living in the gray area in between. All of these creations were produced using Director (a Macromedia authoring program).

NoiseOrgan, by Ryan Francesconi, is my favorite work on the disc. It is a humorous homage to futurism. The interface is laid out as a 5 × 6 matrix. Each square features a black-and-white image, most of which have a retro look to them in terms of their content or graphic design. The 30 squares offer 15 pairs, some clearly and closely related (featuring the same graphic, similar sounds, etc.), while others are more loosely related. When you click on a square, the image becomes animate and a sound begins to play. The animations and sounds have varying degrees of connection to the image they are associated with. By going

"click crazy," it is possible to build up a nice thick montage of sound. The sounds shut themselves off on their own, after a point, while many of the animations continue.

Emma Speaks, by Mary Simoni and Joseph Marchant, is a very attractive, playful work involving video (Mr. Marchant), music (Ms. Simoni), and dance (Emma Cotter—choreography by Ms. Cotter and Mr. Marchant). The presentation takes place over what appears to be pixilated, digitally distorted images from nature. The interface consists of three computer-rendered, two-dimensional, stylized figurines in dance-like positions which toggle to different positions on MouseOver events. Clicking on these figures brings you to new vignettes. Each scene consists of a larger movie of Ms. Cotter dancing in various park-like settings, and a smaller movie showing empty swing sets with the swings in slight motion. The dance movies feature relatively long lap dissolves, which seem to complement the music with its lush harmonies that elide through the use of long release times.

So Yong Kim's work, *shedog*, consists of a looped black-and-white film. The imagery is very dark, and alludes to female grooming rituals. The music, like the video, deals with a lot of low-level repetition. It features several layers, a number of which are looped. Many of these sonic layers consist of trills, suggesting the monotony of the grooming routines. Make no mistake about it, I like *shedog*. I think it is a well-executed video work that is interesting and has something to say. However, I question its inclusion on this CD-ROM, as it doesn't take advantage of the medium in any way. It is clearly a video work that would best be distributed on tape. Seeing the work in quarter-screen video probably doesn't do it justice either.

Perhaps the work that takes advantage of the medium the most in terms of interactivity is *sPhiral* by Tina Jailani. In this piece, one navigates through an abstract, geometrical (fractally oriented) world by clicking arrows on the screen, much the same as in popular video games. Personally, I am not very good at navigating this sort of environment, so I'm afraid I can't say that I have explored the entire work. I cheated, though, and looked at the source material, and found it all very interesting and attractive. Again, having cheated, I found that much of the sound was created using Tom Erbe's SoundHack program. If my guess is correct, Ms. Jailani used many of the same source files in different combinations to create convoluted sounds. The effect of this lends the sound environment the flavor of a registered set; that is, certain frequency components exist in a majority of the sounds. These sonorities make use of the stereophonic spectrum effectively, and at times allude to gamelan music.

Elizabeth Hinkle-Turner's *An object of...* suffers from a bad case of excerpting. It is the third part of a trilogy based upon the composer's experience as a cancer survivor. This particular segment deals with societal expectations of feminine beauty, in light of the composer's experience, and consists of five movements, only three of which are presented on this anthology. By the time this three-movement excerpt is over, it feels as if the work has ended mid-stream. Visual materials are predominantly treated as two-dimensional sprites, and are often pixilated and flat in terms of contrast. However, the composer chose to integrate pixilation into her work so that by the time you're through, it feels like a trait rather than a flaw.

Walking the Faultlines, by Roger Dean, Hazel Smith, and Greg White, seems to be an homage to Dadaism. The work allows you to superimpose several layers of sounds and text. While the work is interesting and amusing, the interface harkens back to the stark days of HyperCard.

The remaining works are predominantly humorous creations fairly modest in scope. *I Love You*, by Laurence Arcadias, is a very funny work in which an animated couple interacts with each other based upon which key the user presses (its use of music is minimal, though, so I'm not sure what it is doing on this anthology). Grace Chen's *Stretch* consists of a short video/sound loop (funny, but not all that compelling). *Funky Funk!*, by Kirsten Beazley, consists of an animated girl who walks progressively faster to progressively faster funk music (again, not funny enough to entice one to watch it again).

Amazingly enough, I had absolutely no technical problems with the CD-ROM. The machine I tested it on was a 240 MHz Macintosh clone with 40 MB of RAM running System 8 (the CD-ROM does not run on Windows or anything else). While the projects did run smoothly when played from my hard drive (as recommended), they also played pretty well straight off the CD.

I hope that ICMA puts out a second CD-ROM anthology. As digitally based artists become better acquainted with this relatively new media, we should begin to see the emergence of a new strain of art, one where the audience is welcomed into the process—empowered, active not passive; an art form unconfined by the linear.