The College-Conservatory of Music Center for Computer Music at the University of Cincinnati is a new environment for computer music composition and research. Composers create sound on powerful systems with signal processing and MIDI, with an excellent listening environment. The technical and aesthetical aspects of computer music can be studied in courses for composers, theorists and performers. Innovative research activity in granular synthesis, live performance interfaces and sound/animation connections is evolving, incorporating collaborative work with faculty in the School of Art. CCM has traditionally had a lively performance environment, and the studies are extending the capabilities of performers in new directions. Computer music concerts and other listening events by students, faculty and visiting composers are becoming regular occurrences.

1 Introduction

An amorphous quality based on many aspects of the environment, including sounds of pieces being created, personalities of those who work there, software under construction, equipment, layout and room design, and architecture creates a unique studio environment. The emerging environment of (CCM)² is intended to be a place for composers, researchers and performers to realize music and software, and for students to learn about the art of digital music, its scientific basis, and the technology of music. While much is to come, a strong foundation of design, courses, equipment and creativity is solidly in place.

2 Architecture and Design

Physically, (CCM)² is part of a complex of theaters, classrooms and studios designed by Pei, Cobb, Freed and Partners. The electronic music studios recently moved to an annex in Memorial Hall, which also houses performance faculty studios and practice rooms, and have been designed with care to provide an attractive and truly functional environment. A floating concrete floor provides sound insulation. Power conditioning provides clean audio. Dimmer lighting avoids glare and noise. Conduits for fiber and audio / video cables connect the studios and allow removal of noisy computer CPUs from the listening spaces. Fiber network connections will be installed for internet access and the studio website. The studios will also be connected by fiber to a new studio theater, for remote processing of sound created and heard in the theater. The theater will be equipped with a sixteen-channel sound diffusion system which will be used by both theatrical productions and electronic music composers.

3 Studio Layout

There are two main classrooms and several smaller studios with specific functions. The third floor classroom contains eight 8500 and 7600 Powermacs, with MIDI software and some digital audio, a Kurzweil 2500, as well as NeXTstep Pentiums, for the introductory electronic music course. The second floor of the annex belongs entirely to the electronic music studios, with a machine room, the advanced classroom and the live studio. The advanced classroom contains computers for signal processing and composition, currently including two Silicon Graphics computers and two NeXTstep machines for the advanced electronic music composition courses, including computer music programming, and the sound animation course. The three smaller studios include the live studio, which houses real time signal
processing, and is a space for composers to work with performers to shape sounds. The other two studios, on the first floor, include one designed for recording and dubbing, with audio equipment and an air circulation system that turns off entirely for quiet. The second smaller studio is for composition, containing a Silicon Graphics workstation.

4 Music and Concerts

The Sonic Explorations concert series showcases the electronic works of student, faculty and visiting composers. Paul Lansky and Judy Klein gave well-received tape music concerts in Oct., 1996. In a related event, Larry Austin visited in January for a performance of his Life Pulse Prelude by the Percussion Group. Visits by Charles Dodge and others are planned.

After the December move to the new studios, most of the works were completed on NeXTstep machines for the (CCM)2 concert presented on Jan 30, 1997, (fig. 1), while the works for the concert on April 28 were done mostly on the recently acquired Silicon Graphics Indy R5000 workstations. Many of these compositions made use of C and Cmix programming languages, taught during the programming course. Tremendous creative energy and ideas were applied to the public domain software, including applications such as Lansky's ein, rt, and Cmix comb filters, Doug Scott's room-simulated environments and mxv, and Helmuth's granular synthesis instruments, to express musical ideas in unique and proficient ways. Some of these works also involved interaction between live performers and prerecorded materials on tape. In the June concert planned at the time of this writing, the emphasis was on live processing of performer's sounds, and included both improvisatory and composed music, combined with the sounds of the demolition of the old studio building.

CD releases are planned to disseminate some of the music of the prolific (CCM)2 composers. Three compositions will be heard at ICMC '97, including Helmuth's "SoundColors" [4] installation, Michael Barnhart's "Sleepwalk Dirge", and "Sirens", by Leon Couch and Bonnie Miksch.

5 Software

Mara Helmuth's music software, including Patchmix [1], a Cmix instrument builder interface, and StochGran [2], a granular synthesis application is on the studio website. A port of NeXTstep StochGran to the Silicon Graphics platform will also be on the archive by the time of this publication. The graphical interface has been improved, and the application is more flexible. Related software, Fsgran, works with FCurve [3], an animation program by Aladin Ibrahim to produce correlated sound and 3-D animation in Softimage. Michael Barnhart, graduate student in composition, received a research fellowship from the University to create programs to generate fractal granular synthesis, and Shyamsundar Vaidhyanathan, an electrical engineering graduate student, is developing granular synthesis programs based on cellular automata.

6 Courses and Programs

Courses in electronic and computer music are offered by the Division of Composition, History and Theory for graduate and undergraduate composition majors in the B.M., M.M., or D.M.A. programs and others including students in music theory, performance, sound design and electronic media. A cognate in electronic and computer music is a well-utilized option for doctoral students in composition, and possible for those in theory or performance as well. Information on CCM programs and admissions may be obtained from Paul Hillner at Paul.Hillner@UC.edu.

The introductory electronic music composition class includes a history of electronic music, advanced MIDI techniques, some digital audio, algorithmic composition wth MAX, mixing on the computer and Csound synthesis. MIDI for Musicians covers MIDI notation and sequencing. Graduate and undergraduate credit is available for the introductory and advanced courses. The advanced electronic music composition course, Computer Music, explores composition on NeXTstep and Silicon Graphics platforms with recorded acoustic sound and synthesis, Cmix digital signal processing and micro- to macro-level algorithmic programs. Aesthetics, performance contexts and graphic scoring of tape and live electronic music are also discussed. Electronic Music Composition / Performance is co-taught by Mara Helmuth and percussionist Allen Otte (Percussion Group), and is an experimental workshop for real time signal processing of acoustic performance. Composers each write for a performer, incorporating Rtcmix processing or other live electronics. All also participate in improvisations,
and put on a concert of both improvised and composed music at the end of the course. The emphasis in composition at the studios has generally been on subtle processing and mixing, often using recorded sound, and on algorithmic processes. Composers often create several pieces a year for tape, tape and performer or live electronics, in addition to acoustic works.

7 Conclusion

While UC-CCM has taught electronic music for decades, the new (CCM)² studios hold promising opportunities for composition and research in computer music. The website, which currently contains home pages of students and faculty, and distributes music software, is being expanded to display multimedia examples of studio work.

8 References


