Center for Contemporary Music
1987-1988

General

The Center for Contemporary Music at Mills College has, for almost 30 years, been at
the forefront of developments in experimental methods in contemporary music and the
allied arts and sciences. Founded in 1961 as the San Francisco Tape Music Center, it
moved to Mills College in 1966, when it was known as the Mills Tape Music Center.
Since it's inception it has achieved a strong international reputation as one of the leading
centers for innovation in music.

The Center maintains a variety of electronic equipment, instruments and labs, provides
instruction and technical assistance, and holds information and recorded archives. The
Center also performs a wide variety of comunity services in the arts, including: public
concerts and lecture series, public access to the facilities, informational and technical
assistance, and artist residences.The Center is one of a few music facilities in the United
States open to the public on a non-profit, non-commercial basis, serving independent
composers, artists, and musical groups, under the Public Access program. This service
and other public programs keeps the Center functioning as an important resource center
for the Bay Area's community of composers and allied artists. It also contributes to an
atmosphere of exciting collaboration and information exchange among students, faculty,
staff and outside professionals.

Courses

Courses taught directly in the Center's facilities concentrate on such topics as
introductory and advanced practices in computer and electronic music, selected problems
in composition and performance, sound techniques for the recording media, music
computation, film techniques, interdisciplinary performance practices, applications of
computers in the arts, and advanced topics in theoretical analysis, arts languages,
experimental aesthetics, and systems design. The Center encourages students to take
advantage of courses in other closely related areas, such as other fine arts disciplines,
computer science, video production, communications studies, psychology, and others.

The Center offers a program of studies leading to the M.F.A. in Electronic Music and the
Recording Media degree with four types of concentrated work:

1)   Composition and performance utilizing electronic media

2)   Interdisciplinary work based in music but involving a variety
      of media forms such as video and film production, staging,
      lighting, scriptwriting, etc.

3)   Research in instruments or systems design, emphasizing fine
      arts computation, real-time performance in computer music,

and experimental control structures for electronic music.

4)   Research in music languages, algorithmic composition, and
        aspects of formal perception and modeling which are
        important to current trends in experimental aesthetics.

These M.F.A. students are the ones who work most directly with the Center's facilities while others in the M. A. in Composition or M.F.A. in Performance and Literature programs are encouraged to pursue concentrated work at the Center as well. Qualifed undergraduates from Music or other departments are welcomed at the Center in the several introductory courses and advanced courses offered.

Special Programs

The Center, in conjunction with the Music Department, presents a series of concerts of new music and allied arts during the academic year. These feature performances and works by guest and resident artists. Many of the performances result directly from collaborative work underway at the Center. With modest assistance from the National Endowment for the Arts, guest artists have presented outstanding performances and have participated in the daily life of the Center through visits to classes, seminars, and informal meetings. In addition, graduate students at the
Center have given highly inventive and well produced concerts. Attendance for these events has been growing consistently. Some of the concerts for 1987-8 include Paul Lansky, Ellen Fullman, Lois Vierk, Mills faculty and staff, and others.

Since 1981, another program, called the Seminars in Formal Methods Series, is a regular forum for the latest ideas in research in arts languages emphasizing music perception, computer music, arts and technology, language research, and experimental aesthetics. These are informal evenings, open to the public, led by guest experts and the Center's staff. This has been a highly successful series and has also generated some support from the N.E.A. A major article, documenting the first five years of the series, has recently been published in Leonardo: The Journal of Arts and Sciences. Guest speakers for 1987-88 included Paul Lansky, Ralph Abraham, John Chalmers, Michel Waiswicz, David Anderson, Barry Truax, and Ellen Fullman. In addition, in spring 1988, the Seminar Series will incorporate a series of public classes on computer music, using the computer music language HMSL, developed at the Center.

A third program, partially supported by the N.E.A., is the CCM Workshop/ Residency Program, a series of short term residencies by guest artists in which they are encouraged to utilize the resources and personnel of the CCM in the creation of new work, and to interact with the students and outside community as much as possible. The residencies may focus on the recording or computer music facilities, or make use of the performance resources present at Mills College. These residencies culminate in a public workshop, which may take the form of either a presentation, informal concert, demonstration, or combination of the above. In 1984-85, three workshop/residencies were on the series, with guest composers Charles Amirkhanian, David Mahler, and Ron Kuivila.

The Center has assisted a number of Bay Area groups with special projects. These have included the Exploratorium, Berkeley Stage Co., KPFA-FM, the Arch Ensemble for Experimental Music, National Public Radio, Video West, Antenna Theatre, George Coates Performance Works, the American Council on Foundations, TELLUS Cassette Magazine, the American Music Center, OPtion Magazine, the International Peformance Network, Mafish Performance and Dance Company, Opus one records, and others. Documentary material for television has been filmed or video taped at the Center, highlighting special activities and including material for Columbia Pictures Television, Disney Cable TV, and Peralta College Television. Additionally, work at the Center has been featured in numerous radio broadcasts and several local, national, and international publications.

The Center also maintains its Public Access policy. Composers and artists are encouraged to propose projects to the CCM, and if approved, the CCM will often provide financial assistance in the form of studio time, and graduate assistants for technical assistance.
Staff

In addition to 1.75 FTE teaching faculty in electronic music, composition, sound techniques, and film, the Center is supported administratively and technically by one full-time Technical Director, two part-time Technical Assistants, one part-time work-study student and five Graduate Assistants.

Current teaching and support staff for 1986-87, where '*' indicates teaching staff, are:

>   David Rosenboom, Composer, Director of the CCM *
>   Thomas Erbe, Technical Director
>   Larry Polansky, Composer, Technical Assistant in Music Computation *
>   Phil Stone, Technical Assistant for the Recording Studio, Studio Management,
> and   Hardware Development
>   Maggi Payne, Composer *
>   Anthony Braxton, Composer and Milhaud Associate Professor *

Guest faculty for 1987-88 include composers Arturo Salinas, Chris Brown, and Robert Hughes. In the past few years, guest faculty composers have included Pauline Oliveros, Conlon Nancarrow, Charles Amirkhanian, and many others.A number of Graduate Assistants contribute technical, production, instruction, and support services to the Center's Activities.

Facilities

The Center's individual studios, labs, and major equipment items are as follows:

>   . Recording Studio
>   . Introductory Hybrid Computer Music Studio
>   . Advanced Hybrid Electronic Music Studio

. Dubbing and Editing Studio
. Technical Laboratory
. Wetmore Lodge Film Studio
. Concert Equipment
. Archives

Development Projects Underway 1986-1987

Much of the technical and artistic development at the CCM is focussed in the Hybrid
Computer Music Studio, and the Recording Studio. In recent years, these studios have
been significantly upgraded to reflect state-of-the art equipment and ideas. The Hybrid
Computer Music Studio includes several systems for synthesis, composition, and
performance. All are linked under MIDI (Musical Instrument Digital Interface) and other
communications channels. Various forms of synthesis (sampling, linear FM,
waveshaping, and others) , processing and software (many high-level and assembly
languages, special purpose applications and music programs) are supported in this studio.
A link to the Mills College VAX 11/780 provides another source of music computation
facilities and a number of music programs running on a Macintosh computer have been
installed.
The CCM has been engaged in recent years in the development of theoretical and
experimental approaches to computer music languages. One original, innovative
example, HMSL (Hierarchical Music Specification Language),has been implemented on
special purpose machines in the studio, as well as on more commonly available systems
like the Apple Macintosh and the Commodore Amiga. This project is being facilitated by
receipt of a $15,000 grant from the Inter-University Consortium for Educational
Computing (ICEC). This grant supports continued research and development of HMSL,
including a "port" of this language to a powerful, UNIX-based workstation
environment. In addition, the studio includes a TOUCHE digital-waveshaping keyboard
based synthesiser, complete with FOIL-85 (an instrument definition and performance
language) and Meta-FOIL, a compositional language written by David Rosenboom.
HMSL (Version 3.12) has now been distributed widely to many institutions and
individuals, and has been written about, demonstrated and used by composers
internationally.

We are currently in the process of installing a high-level music workstation in the Hybrib
Computer Music Studio, which will run a full range of software, and include facilities for
software synthesis and audio conversion.

The Hybrid Computer Music Studio is linked via data, and audio lines to the CCM
Recording Studio, an 8-track facility with 2-track digital mastering, outboard processing
and control equipment. MIDI connects these two studios, so that the facilities of each
one can be utilized together. Many records have been made in this facility, including the
recent Music from Mills, a three record anthology featuring twenty-one composers who
have been affiliated with the CCM and the Music Dept. over the years. Music from Mills
has received wide critical acclaim, including being named by the New York Times as one
of the "ten best" classical records of the year.

Lastly, a recently completed project has been to construct the Introductory Hybrid Electronic Music Studio. This involved installation of an IBM-PC compatible micro-computer, and an assortment of languages for analog and digital synthesizer control, including HMSL, some high level computer languages (like C, FORTH, and PASCAL), special purpose synthesis control packages (for example, one specifically targeted to the Voyetra polyphonic synthesizers in the studio), and MASC, a MIDI and analog controlled composition environment developed at San Jose State University. This project was supported in part by a faculty development grant to L. Polansky. This studio serves as an undergraduate teaching facility and as an introductory facility for public access users wishing to begin working in computer music. The studio is also equipped with multi-track cassette recording facilities.

CCM Facilities Summary

Recording Studio

Otari MX 7800 8-track one inch tape recorder (15 and 30 IPS) with CT-501 Tape Timer and CR-706 Session Remote
CT-501 Tape Timer and CR-706 Session Remote
Amek Scorpion audio mixing console,16x4x8x2x2,dbx noise reduction, and   16 channels
Lexicon PCM 70 Digital Effects Processor
Hafler 120 Headphone Amplifier
A+D Sony PCM 701-es Digital Audio Processor
Sony SLO-420 Beta VCR
Panasonic AG-6200 VHS VCR
Dolby C noise reduction, 2 channels
Lexicon Super Prime Time Programmable Digital Delay processor
SAE 2700B octave equalizer
Crown Power Amplifiers (2)
Phase Linear 1000 auto correlator
Nakamichi MR-1 Discrete Head Professional Cassette Deck
DBX 166 Compressor/Limiter
Symetrix SE-400 Stereo Parametric Equalizer
Dual CS528 turntable
JBL 4312 room monitor speakers (2)
Modest collection of microphones, stands and cables
Auratone auxiliary monitors
Miscellaneous small devices, headphones, and other equipment

Introductory Hybrid Synthesizer Studio

IBM AT (clone) with 1 megabyte memory, 40 megabyte hard disk, MIDI interface, 1 megabyte internal disk drive
A large collection of commercial and public domain music and general purpose software, including Voyetra's Sequencer+ and Patchmaster, CMU MIDI Toolkit, UCSD MIDI

CMUSIC Package, MASC, and FORTH, C, PROLOG, and LISP compilers
Moog 3p synthesizer with additions
AKG BX10 Reverberator
SAE amplifier
Hafler 120 Power Amplifier
Kawai 8-in, 2-out keyboard mixer
JBL 4311 Studio Monitor Loudspeakers (2)
Teac 255 Syncassette overdubbing 3 head stereo cassette deck
Sony TCK-3 Stereo Cassette Deck
Audio-Technica 6 channel mixer/4-track cassette recorder AT-RMX64
Four Voyetra Eight-voice polyphonic synthesizer modules
Advanced Hybrid Electronic Music Studio

Macintosh Plus computer, with SCSI, 20Mb hard disk, Octave Plateau MIDI adapter,
external 3-l/2" drive, Imagewriter Plus Printer, and a wide range of commercially
available and experimental software, including HMSL, Mark of the Unicorn Professional
Composer/Performer, Intelligent Music's M and Jam Factory, MIDILisp MIDIMac Patch
Librarian, Kurzweil MacAttach, and high level languages, and a wide variety of other
music and general software
Phillips Magnavox Compact Disc Player
JL Cooper MIDI programmable Patcher, Model 16/20
JL Cooper MIDI programmable Patcher, Merger, and controller, MSB+
Buchla 400 digital sound generator
Buchla 364 multiple arbitrary function processor
Kurzweil 250 Sampling Keyboard Synthesizer
Linn 9000 Integrated Digital Drums/Midi Keyboard Recorder
Kawai Electronic Grand Piano (w/MIDI Oberhneim XPANDER 6-voice analog MIDI
controllable synthesizer
Garfield Masterbeat SMPTE-MIDI synchronizer with additional RS-232 capability (on
order)
Ramsa WA8210 audio mixer, with eq. on each track, 10x4x2
Crown power amplifier
Buchla 100 analog synthesizer (obsolete, not in use, of historical interest only)
Serge voltage-controlled audio processing modules
JBL 4430 studio monitors (2)
Studio patch bay with bidirectional audio and signal lines at all stations, and to other
studios
Gentle Electric Pitch-Voltage Converter/Envelope Follower
Televideo 910 terminal used for VAX/UNIX access
Onkyo cassette tape recorder with Dolby C/B
MC68000-based microcomputer (main CCM computer) with:
       * ERG central processor
       * 256kb dynamic RAM memory board
       * 64kb static RAM memory board 2Mb Macrotech dynamic RAM
       * SSM serial/parallel input/output board
       * I/O Technology Multi-I/O Board

* Scion high-resolution graphics board
* Dual systems analog-to-digital and digital-to-analog converters
* Qume QVT 101 terminal
* Centronics 729 printer
* Qume DT-8 dual 8-inch disk drives
* Tarbell disk controller
* USI monochrome monitor
* Synthesizer controller interface board (in-house design)
* Optomouse
* extensive software, including customized and expanded FORTH/68K

Assembler operating system (with object oriented language extensions, hardware drivers, and HMSL (1.1) Composition language.

TOUCHE computer assisted keyboard instrument designed by Don Buchla and David Rosenboom with:
* 8-voiced pipelined-multiplexed digital oscillator with wave-shaping, timbre modulation, and non-linear FM
* 64 channel Function Processing Unit for time variant hybrid control operations
* TI 9900 micprocessor (16 bit, Marinchip CPU)
* serial I/O
* real time clock
* 64kb memory
* disk controller
* Low resolution graphics board
* 12" Goldstar monochrome MBM-2233 data monitor
* Qume QVT-101 terminal
* Shugart Qume 8" dual floppy disc drive
* extensive software, including FOIL-85 instrument definition language, META-FOIL compositional =environment, MDEX operating system (w/editor, word processor, Assembler, FORTH, BASIC, PASCAL, and extensive utilities), and META 3.5 meta-compiler.

Dubbing and Editing Studio

Technics turntable
A+D Sony PCM 701-es Digital Audio Processor
Sony SLO-420 Beta VCR
Sony 2-track recorder TC850
Revox A-77 2-track recorder
Scully 280-B 2-track tape recorder
Ramsa WA8210 audio mixer, with eq. on each track, 10x4x2
Ampex 4-tr 1/2" tape recorder
Aiwa WX220 Stereo Cassette Dubbing Decks (2)
Sony Dolby C NR 500 Unit

Sony TC1865D cassette recorder
Onkyo cassette dubbing deck
Dynaco preamplifier
JBL amplifier

Project Development Laboratory

Tec 500 terminal (primarily used for UNIX link)
Hewlett-Packard 64100A microcomputer logic development station (shared with ACC)
Hewlett-Packard 1740A oscilloscope (shared with ACC)
Rockwell AIM 6502 station (with FORTH ROM)
DEC VT-240 terminal with graphics capability (UNIX) and LA100 Letterwriter printer (ACC)
KAYPRO II with dual disk drives and integrated software (word processing, data bases, FORTH-83 and fig-FORTH, several languages, and utilities)
        Epson MX-80 dot matrix printer
8080 Microcomputer with PATCH-IV hybrid control system
        Philips PM 3214 oscilloscope
        Fluke multimeter
        Miscellaneous test gear and tools for circuit design, testing and maintenance

Wetmore Lodge Film Studio

        Modest equipment for Super-8 and 16mm film editing, 16mm post production, sound mixing and limited animating

Concert Equipment

        JBL 4435 Loudspeakers (4)
        Altec A-7 loudspeakers (2)
        Carver amplifiers (2)
        KLH loudspeakers (2)
        PAS 12" Monitor "Wedge" Loudspeakers (2)
        Hafler P500A power amplifiers (2)
        Hafler 60 watt GH-l20 Amplifier (monitor)
        Miscellaneous concert set-up hardware, wiring, and microphones
        Kodak Ektagraphic slide projectors (2)
        Teac Model 2a Mixer
        (N.B. We are currently in the process of refurbishing the Mills Concert Hall, and in this regard are completely rebuilding the permanent audio facilities there.)

Archives

Extensive collection of recorded materials, mostly made at Mills (including concerts by guest artists, M.F.A Thesis Concerts, and other materials)

Complete recorded archive of the CCM Seminar in Formal Methods Series
Large collection of technical journals, periodicals, and books.

CENTER FOR CONTEMPORARY MUSIC
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