Abstract

YalMusT, Yale University's Music and Technology Center is a new environment at Yale University for research, performance, and pedagogy in music, video and technology. This report provides an introduction and an overview of the facilities and equipment, software tools, creative work, curricular projects, course offerings, concerts and demonstrations, and WWW sites that comprise the activities at YalMusT.

1 Introduction

YalMusT, Yale University's Music and Technology Center opened in the fall of 1998. The Center services a variety of constituencies (undergraduates, graduate students, staff and faculty) and functions in tandem with Yale's Digital Media Center for the Arts and Center for Academic Media and Technology. Those working at YalMusT focus on the creative interaction between music, video and technology and the research, performance and pedagogical impact of that focus. The user-group we serve is comprised of graduate and undergraduate music students of the Department of Music as well as undergraduate liberal arts students throughout Yale College. Students enrolled in fundamental musicianship courses, composition classes, as well as courses in music, video and technology, and those pursuing graduate studies use the YalMusT facilities.

2 Facilities and Equipment

YalMusT is located in the Department of Music at 143 Elm Street in New Haven, Connecticut USA. The facilities are open twenty-four hours a day, seven days a week. Currently, there are twenty-one computer workstations distributed among several studios.

Studio B16A is a general-use studio of eight G3 (beige and blue & white) workstations with keyboard controllers and CD-RW drives. Each workstation has a suite of general software tools that includes analysis, ear training, notation, digital signal processing, interactive, synthesis, sampling, recording, editing, mixing, sequencing, graphics and video software.

Studio B8 is an intermediate, general-use studio comprising four G3/G4 (blue & white and gray) workstations each with keyboard controllers and CD-RW drives. Each workstation couples the suite of general software tools with more advanced development and research tools.

Studio B10 is an advanced interactive and mastering studio comprised of a single G4 (gray) workstation, a keyboard controller, an Akai EWI wind controller, a Zeta Jazz violin controller, the software-based Very Nervous System, and an I-Cube controller with sensors. Mastering and post-production software tools, mixer, microphones, speakers, a DVD-ram drive, and cassette, video and DAT recorders complete the studio. An HP printer, two Epson scanners, two mobile G3 laptops, a mobile Dell Latitude laptop, microphones, a portable DAT recorder, and a Sony portable projector and videocam are available for use by members of the YalMusT community.

Studio B16B is a development and research studio with five G3/G4 (blue & white and gray) workstations. There are three servers -- an OS X server with the Quicktime Streaming Server 2.0, a Filemaker Pro database server and an Appleshare IP server -- and two workstations each with keyboard controllers and CD-RW and DVD-ram drives. The workstations have the general use software, as well as more advanced development and research tools.

YalMusT shares two interactive mobile computing environments with the Digital Media Center for the Arts at Yale. One is Abstracted Cisms and the other PIPS (portable interactive performance system). The hardware for the Abstracted Cisms project includes a G3 tower and G3 laptop running MAX/MSP, Nato and softVNS, with the Akai EWI wind controller, the Zeta Jazz violin controller, a Panasonic security camera, an I-Cube controller and a portable sound system. The PIPS system comprises two G3 laptops running MAX/MSP and STEIM software, a Dell laptop with Linux running RT-Cmix, a video mixer and a portable sound system.
3 Software Tools

Analysis: mod12 (T. Denske).
Archiving: Jam 2.6, Toast Deluxe 4.1 (Adaptec).

Authoring/Reading: Acrobat 4.1 (Adobe); BBEdit 5.1.1 (BareBones); ClarisWorks 4.0 (Claris); CommonSpace 3.5 (Houghton Mifflin); Microsoft Excel 98, Microsoft PowerPoint 98, Microsoft Word 98 (Microsoft); WordPerfect 3.5 (Corel).

Digital Signal Processing: fusion:VOCODE and fusion:FILTER ( Opcode ); Harmony 1.0, HyperEngine 2.4.4, HyperPrism 2.5, Ionizer 1.3, RayGun 1.2 (Arboretum); Plugo 2.0.8 (Cycling74); SFX Machine 1.2 (Bias); SoundHack (T. Erbe).

Ear Training: MacGamut 2000 (MacGamut); Practica Musica 4.1.1 (Ars-Novia).

Interactive: M 2.5.8, MAX 3.6.2, MSP 1.7.2 (Cycling74); nato.0+55+3mdmular (N. Nezvanova); sofVNS (D. Rokhey).

Midi: OMS 2.3.8 (Opcode); Romeo Classical Midi Library (Romeo International); Twiddly Bits (Keyfax).

Mixing/Recording/Sequencing: Cubase 5.0, ReCycle! 1.7 (Steinberg); Deck 2.6.3, Peak 2.1 (Bias); MetaTracks 1.3, Xs 1.3 (U&I Software); SoundEdit 16 2.0.7 (Macromedia); VocalWriter 1.0 (Kaelabs).

Multimedia: GoLive 5.0, Illustrator 9.0, LiveMotion 1.0, PhotoShop 5.5 (Adobe); FinalCut Pro 1.2.5, QuickTime Pro 4.1, QuickTime VR 1.0.1 (Apple); Avid Cinema 3.0 (Avid); HomePage 3.0 (Claris); Director 8 Shockwave Studio, DreamWeaver UltraDev Fireworks 3 Studio, Flash 5 (Macromedia).

Notation: Finale 2000c (Coda Music); Photoscore 1.75 (Neuratron); Sibelius 1.3 (Sibelius); SmartScore 1.3 (Musitek).

Sampling/Synthesis: ArtMatic 1.0, MetaSynth 2.6, Videodelix 1.0 (U&I Software); Csound for PPC; Retro AS-1 2.0, Unity DS-1 2.0, VooDoo Drum Machine (Bitheadz); Reaktor 2.3 (Native Instruments); VSC-88 3.0 (Roland); Re-Birth RB-338 2.0, ReCycle! 1.7 (Steinberg); VocalWriter 1.0 (Kaelabs); VST plugins - LM-4 percussion synthesis module (Steinberg), Model-E analog synthesis module (Steinberg), Pro-25 vintage synthesis module (Native Instruments), Waldorf PPG wave synthesis module (Steinberg).

Management/Operations/Utilities: AppleShare IP 6.3, OS 9.0.4, OS X Server 1.2, QuickTime Streaming Server 2.0 (Apple); FileMaker Pro 5.0 (FileMaker); MacAdministrator 2.0 (Hi-Resolution); Media Cleaner Pro 4.0.2 (T erran); QDesign Music Encoder 2.1 (QDesign); Sorenson Video Developer 2.1 ( Sorenson Media); Stuff it Deluxe 5.1 (Aladdin); Testing Tools 1.4 (Thomson Learning); Web Crossing Server 3.1 (Web Crossing); Web Event Server 3.3.4 (Web Event).

4 Creative Work

Abstracted Cisms is an interactive, real-time composition performance environment being developed by Director, Professor Kathryn Alexander. The concept was originally presented by Professor Alexander on the lecture series "Artists on Art" sponsored by the Yale University Gallery of Art. For that lecture she created examples of sonic landscapes based on Willem DeKooning's Untitled XIII. Abstracted Cisms is a follow-up project in the form of a computer-generated live performance environment. All generating and processing algorithms for the interactive environment are derived form the analysis of the spatial relationships between abstract shapes in DeKooning's painting. Abstracted Cisms is participatory, allowing the performers to select elements of DeKooning's painting as sources for audio and video generation. The environment is realized with a G3 tower and G3 powerbook running MAX/MSP, nato.0+55+3mdmular and sofVNS, with the Akai EWI wind controller, the Zeta Jazz violin controller, a Panasonic security camera, an I-Cube controller and a portable sound system.

Associate Director, Professor Matthew Sutter is currently working on a large-scale performance piece for choir, dancers and multimedia, The Ankle-Diver, with Yale School of Drama playwright, Tim Acito. The Ankle-Diver is a co-production of the Department of Music, the Digital Media Center for the Arts and the School of Drama. The performance will take place simultaneously at two sites on campus: a real-time interactive video installation at the Digital Media Center for the Arts facility and a simultaneous performance at the Yale School of Drama's new Experimental Theater. The video installation will be controlled by a multi-user interactive environment installed in the Digital Media Center for the Art’s Intel Lab. Images from this performance will be telecast to theater. In this theater, the choir and dancers will perform against a projected digital backdrop created at the Digital Media Center for the Arts and live signal processing using MAX/MSP.

5 Curricular Projects

Curricular projects include ViCH, the Virtual Concert Hall, and ViMA, the Virtual Music Archive. ViCH is a WWW site located on an OS X server that runs Apple's QuickTime Streaming Server 2.0. The real-time streaming protocol allows for the online use of a media archive of over 3,500 files in approximately twenty-five to thirty music courses each academic year (servicing approximately 1,600 to 2000 students). ViMA is a WWW site located on a Windows NT server and is an archive of more than 50,000 downloadable audio and video media files. See Appendix A.
Ear-training instruction involves two hundred and fifty students per semester distributed among four courses (Music 110, Music 111, Music 210 and Music 211). Two professors and nine teaching assistants teach aural and musicianship skills with software and notation tools.

Composition and music technology instruction involves two professors and six teaching assistants teaching the two year composition seminar (twenty-five students combined in Music 312 and Music 412 each semester) and the one year music technology sequence (250 students enrolled throughout Music 290a, Music 295La and Music 390 each year).

6 Course Offerings with Technological Instruction


7 Concerts and Demonstrations

Yale faculty, staff and students present concerts and lecture-demonstrations with several series that include: Yale College New Music, New Music New Haven, the Digital Media Center for the Arts, and both the Department of Music’s Friday Noon Talks and Colloquium Series; and at professional conferences and organizations.

8 Websites

http://www.yale.edu/yalemus/yalmust
http://www.yale.edu/yalemus/yalmust/vima
http://www.yale.edu/yalemus/yalmust/vich

9 Conclusion

Although electronic and computer music have been taught for decades at Yale’s School of Music the recent implementation of YalMusT, Yale University’s Music and Technology Center, provides a greater ability to study and promote the creative interaction between music, video and technology and the research, performance and pedagogical impact of that focus. The center, its facilities, software tools, activities and WWW sites are currently under expansion.

Appendix A: Structural Diagrams of ViMA and ViCH

ViMA - Virtual Music Archive

ViMA is a searchable, static WWW site of instructional media for curricular purposes. Material designed and implemented for user download. Uses a staff-designed and implemented site-specific, perl-scripted search engine for retrieval of materials. Contains over 50,000 files.

[Diagram of ViMA structure]
ViCH - Virtual Concert Hall

Searchable, dynamic databases designed and implemented with Filemaker Pro and mounted on a Blue G3 running Filemaker Server. Media files are accessed via the real-time streaming protocol from an OS X server that runs the QuickTime Streaming Server 2.0. Streams over 3,500 media files.

Virtual Concert Hall

Master Audio ID Database

Music Information Database

Indexical Class Databases

Audio ID Number: Creation Date Modification Date File Location

User-defined, annotated database. Implemented by YalMusT staff, but may be edited at the WWW site

Indexical databases designed by faculty and instructors. Implemented by YalMusT staff.

Audio file info:
- Title
- Composer/creator
- Performer
- Conductor/director
- Publisher/recorder
- Date
- Length

As a simple example, fields and nested lists could include genre types and instrumentation lists, among many other possibilities.

Fall courses:
- 112a, 130a, 150a, 160a, 243a, 265a, 290a, 310a, 312, 350a, 372a, 396a

Spring courses:
- 112a, 130a, 150a, 160a, 243a, 265a, 290a, 310a, 312, 350a, 372a, 396a

Classical
- Medieval, Renaissance, Baroque, Classical, Romantic, Modern, Contemporary
- Acid, Avant-Garde, Bebop, Big Band, Blues, Cool, Dixieland, Free, Fusion, hard Bop, Instrumental, Latin, Modal, Ragtime, Smooth and Swing
- Alternative, Country Western, Funk, Heavy Metal, Latin, Motown, Rap, Reggae, Rhythm & Blues, Rock and Soul
- Computer, Electronica, Interactive, Multimedia, Musique Concrète, Sampled, Synthetic and Techno

Jazz

Pop

Technological

World music

Regions

Countries

Instrumental, Vocal solo, Vocal with instruments