Music Technology at Florida International University

Kristine H. Burns

School of Music, Florida International University
email: burnsk@fiu.edu
website: http://www.fiu.edu/~midi

Abstract

Over the last 20 years, there has been an increased need in the computer and electronic music industries and in arts and technology communities for the acquisition of knowledge and techniques from a number of disciplines. Students enter college with many more computer skills than ever before. What they often lack, however, is artistic direction and formal education. The Music Technology program at Florida International University in Miami, Florida provides an interdisciplinary core curriculum in which students study electroacoustic music, sound design, multimedia, physics, and computer science. Housed in the School of Music, the Bachelor of Music and Master of Music degrees are designed for candidates who have a background in instrumental or vocal music and who are also interested in computer science, mathematics, or physics.

1 Introduction

The Florida International University (FIU) School of Music, part of the College of Arts and Sciences, is located in the US$ 16 million Wertheim Performing Arts Center. This facility houses a 700-seat concert hall as well as several smaller performance halls, faculty offices, practice rooms, and one of our computer music studios.

The School of Music enrolls approximately 300 music majors in the School of Music (220 undergraduates and 80 graduate students). Majors include music composition, performance, conducting, jazz studies, performing arts production, and, most recently, music technology.

Founded in 1989 by composer Orlando Garcia, the Electronic Music Studios began as one of the first teaching studios in South Florida. In 1996, the facility was split into two facilities—the Music Technology Center in the Wertheim Performing Arts Center, and the Computer-Assisted Instruction Laboratory housed in the Green Library. Soon after, a full complement of courses was devised, not only to enhance the composition curriculum, but also to encourage students who wanted to exclusively study electroacoustic music.

The current facilities include digital audio workstations, multimedia hardware and software, synthesizers, samplers, and basic equipment for field recording.

In 2001, a Master of Music in Music Technology degree was introduced. The new Bachelor of Music in Music Technology is underway in Fall 2003.

2 Facilities

The primary studio, housed in the School of Music, includes G4 and iMac workstations equipped with a variety of hardware and software, including Kurzweil K2vx sampler/synthesizers, Yamaha EX5 synthesizers, and a KYMA system. Additionally, this laboratory has a Tascam DA-88, a Tascam 428 control surface, and a Yamaha O1V digital mixer. Courses in advanced computer music topics, multimedia, CD-ROM and DVD design, and sound reinforcement are taught in this facility.

The second studio is located in the Green Library. This facility has over 18 workstations with iMac, G3, G4, and Pentium II computers, as well as Kurzweil K2vx sampler/synthesizers and Roland XP-20 synthesizers. This laboratory also has an overhead projection system, which makes it a desirable room for teaching larger classes. Courses MIDI technology, music education, and theory are taught in this facility.

3 Undergraduate Curriculum

The Bachelor of Music in Music Technology curriculum is designed for candidates who have a background in instrumental or vocal music and who are also interested in computer science, mathematics, or physics. Performance on a traditional instrument or voice is required, and students must pass an audition before they are admitted to the School of Music is granted. Additionally, a working knowledge of music software such as Finale, Sibelius, Cakewalk, and Pro Tools is highly desired. Most Music Technology majors begin with the Introduction to MIDI Technology course and continue through the sequence of music technology courses, although the exceptional student can be placed directly in Electronic Music I or II.

The curriculum is designed to include all lower division music classes, music technology courses, Physics of Music, and introductory Java classes, as well as all of the general university requirements. One hundred twenty-one hours are required to graduate.

Further requirements for a B.M. in Music Technology include (1) a "B" average in all upper and lower division Theory, Ear Training, and Electronic Music courses (2) the completion of a senior thesis project of hardware, software, sound design, or audio installation, and (3) the passing of a final oral exam.

All undergraduate Music Technology majors are required to develop a four-credit Senior Thesis Project before graduation. The project may include, but is not limited to, software or hardware design, significant World Wide Web development, CD-ROM or DVD production, sound installation, or sound design. Students are required to have at least three members of the FIU faculty on a committee to oversee the progress of the thesis project. These committee members are not limited to the School of Music faculty, but may include related areas such as computer science, art and art history, or physics.

A final oral exam testing the student's knowledge of electroacoustic music history and techniques is conducted by the Music Technology faculty after the Senior Thesis is completed and presented.

4 Graduate Curriculum

The Master of Music in Music Technology degree is designed for candidates possessing an undergraduate music degree, or a degree computer science and engineering that has included substantial coursework in music.

The M.M. in Music Technology requires 36 hours past the Bachelor's degree for completion of the degree, including six credit hours of thesis. Graduate students in the program are required to spend a semester serving as an intern at a national or international music technology company or studio.

The culmination of a student's work at FIU is the thesis project, which may take the form of music software or hardware, audio installation, interactive digital media including CD-ROM or World Wide Web site, or other multimedia projects such as a DVD compilation.

The curriculum is designed to include seminars in computer music (history, programming, literature, aesthetics); experimental arts; sound reinforcement; and film scoring. Physics of Music is required of all graduate students, as is additional study in computer science with Java or C++ programming.

Graduate student enrollment is limited to two or three students every year. Our first graduating class will matriculate in 2003. Current thesis topics include Chia-Chun Chen's (Taiwan) *Electronic Music: An Interactive CD-ROM for Children* and a radio play by Alexander Gonzalez (USA).

5 Course Content

A full complement of music technology courses is offered to both undergraduate and graduate students in Music Technology. Required of all music majors in the School of Music, the Introduction to MIDI Technology course offers a basic overview of computer applications to aid in music notation and sequencing. Basic MIDI concepts are covered including music applications on the World Wide Web. The course is centered on Finale and Pro Tools. Each student is also responsible for creating an original web page on some aspect of music technology. Graduate Teaching Assistants teach two sections of this course every semester. The course text is *The MIDI Manual* by David Miles Huber (Focal Press, 1998).

All lower- and upper-division courses in electronic music are taught by Kristine H. Burns. The first in a sequence of lower division music technology courses, Electronic Music I, covers digital audio recording, editing, and sampling. Peak, Pro Tools, and Sound Hack are used in this course. Special emphasis is placed on the history and development of electronic music from early electronic instruments through concrete, analog, and early digital synthesis. The course text is *Electronic and Computer Music* by Peter B. Manning (Oxford: Clarendon Press, 1994).

The second course in music technology focuses on interactive computer music composition and performance using Max/MSP. Special emphasis is placed on algorithmic composition. The course text is *Composing Interactive Music: Techniques and Ideas Using Max* by Todd Winkler (MIT Press, 2001).

The first of two upper division music technology courses is Electronic Music III, which focuses on digital sound synthesis using various applications including Csound, Max/MSP, and SuperCollider. Emphasis is placed on synthesis techniques, and real-time control over sonic elements. The course text is *The Computer Music Tutorial* by Curtis Roads (MIT Press, 1996).

Electronic Music IV, the last course in the music technology sequence, focuses on multimedia. Creative projects include video compositions, interactive art and educational CD-ROM and World Wide Web sites, and other related activities.

Experimental Arts, an interdisciplinary class at FIU, has proven to be a popular class among music technology majors. Students from three different disciplines in the arts (music, dance, and visual arts) work together, becoming more aware of other disciplines while creating a large collaborative work. Interdisciplinary faculty for this course include composer Orlando Garcia and members from the Department of Visual Arts and the Dance

Department. The course text is *Performance Art From Futurism to the Present* by Rose Lee Goldberg (Harry N. Abrams, NY, 2001).

Required of all graduate and undergraduate Music Technology majors, Physics of Music is taught by James Webb, Associate Professor of Physics. The goal of the course is to provide a physical understanding of sound, audio reproduction, and electronics that are necessary for musicians to understand to take full advantage of modern electronic and musical equipment. The course concentrates on the physical principles behind the phenomena rather than advanced mathematics. The level of mathematics is restricted to algebra and trigonometry. We incorporate labs into the class to demonstrate the precise measurement of various quantities involved in the generation of sound and wave motion. The course text is *The Science of Sound* by Thomas D. Rossing (Addison-Wesley, 2001).

We currently have 10 undergraduate majors who will transfer in as upper division music technology majors in Fall 2003, and we anticipate three or four entering freshmen the first year.

6   Faculty

Three primary professors oversee the Music Technology curriculum—Kristine H. Burns, Orlando Jacinto Garcia, and James Webb. Composer and author Kristine H. Burns is the Director of the Electronic Music Studios and an Associate Professor of Music. She has previously served on the faculties of both Dartmouth College and the Oberlin College Conservatory of Music. As the owner and editor of WOW/EM—Women On the Web/ElectronMedia (http://music.dartmouth.edu/~wowem), she has created an award-winning educational web site for young women interested in creative digital media, as well as science, math, and computers.

Composer Orlando Jacinto Garcia is the recipient of numerous honors and awards including the Rockefeller, Fulbright, Dutka, and Cintas Foundations. He founded the New Music Miami Festival and the Music of the Americas Festival. Garcia is Professor of Music and Director of the Composition Program, as well as Graduate Studies at FIU.

James R. Webb is Director of the Southeastern Association for Research in Astronomy (SARA) Observatory and an Associate Professor of Physics at FIU. His research interests include Quasars and Active Galactic Nuclei; Multifrequency Variability of Blazars; and Time Series Analysis.

7   Conclusion

Florida International University, Miami's public research university, is truly a unique environment. FIU has over 34,000 students and 1,100 full-time faculty, making it the largest university in South Florida and placing it among the nation's 30 largest colleges and universities. The University has two campuses—University Park in western Miami-Dade County and the Biscayne Bay Campus in northeast Miami-Dade County—and an educational site that serves nearby Broward County. The university is quite young, only 35 years old. In 1995 the School of Music had only a 50 music majors and 11 full-time faculty. We currently have over 300 music majors, 24 full-time, and 40+ part-time faculty. With that being said, we has one dedicated Graduate Teaching Assistant in Music Technology, one Graduate Fellowship to serve as webmaster for the School of Music, and one part-time Lab Assistant.

The combination of electroacoustic music, physics, experimental art production, and sound design provides FIU graduates with the necessary background knowledge to work in many music and technology industry careers.

References

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