ABSTRACT

Arizona State University has developed a new model for the American Research University, creating an institution that is committed to excellence, access and impact. Two of its four campuses offer programs in arts that are interdisciplinary and include potential for undergraduate and graduate studies in computer music.

1. INTRODUCTION

ASU is often branded by its President Michael Crow as “One University in Many Places”. There are four campuses: Tempe, West, Downtown, and Polytechnic. The Digital Culture program (https://digitalculture.asu.edu) within the School of Arts Media and Engineering (http://ame.asu.edu) in Tempe has developed a novel model of concentration programs to create an interdisciplinary approach to both undergraduate and graduate studies in media arts and engineering. The program consists of concentrations in music, art, design, architecture, theatre, film, dance, electrical engineering, computer science and entrepreneurship.

The Tempe campus is also home to the School of Music, which offers a composition program with studies in electronic and computer music.

On the West Campus of ASU, the Interdisciplinary Arts and Performance (IAP) undergraduate program is offered. The IAP program was one of the first of its kind in the US, and strives to develop artists with a solid understanding of a broad range of artistic practices and theories. IAP recognizes the importance of collaboration in contemporary arts production and the need to focus on concepts and topics instead of tools, even when using the most sophisticated technologies.

2. UNDERGRADUATE CURRICULA

2.1 Digital Culture

The music concentration stream of Digital Culture brings together a number of courses specifically addressing performance with new interfaces, an Introduction To Digital Audio which focuses on the materiality of sound rather than being a technically driven course, a Hybrid Digital Ensemble class and a unit of Advanced Interactive Sound which combines the skill sets gained in the previous classes with gestural and environmental inputs to create rich media interactive works.

In the Intro to Digital Audio, we establish a framework for the consideration of sound as a material - this allows us to step away from traditional pedagogical approaches to music and to consider the source, sound itself, as a fundamental material which has properties that, when understood provides the basis for manipulations that could be utilized to design anything from soundscape to orchestral works. We discuss properties such as mass, density, surface texture, viscosity, density...

This approach places experimental music and sound as simply another expression of sound as material and not as an alternative or far out practice.

The progression of assignments in this class moves from finding any sounding source around the computer that could be used to make a rhythmic pattern and recording that and working with that to understand it, to again finding any sounding source to hand and using it to develop a textural sound, where contemplation of timbral and spectral content is the focus, to the exploration of basic manipulation techniques using equalization and delay (intervention in the frequency domain and time domain) to the consideration of orchestration, layering, polyphony and spatialization of sound.

The third assignment in this progression furnishes the students with a three-minute white noise file (containing all frequencies at equal energy), and asks them to use the tools previously explored to carve out of that block of white noise a musical or sound work. They can approach this in several different ways building texture and rhythm and then orchestrating or mixing those layers to create a more complex work, or focus on the simple and clear manipulation of the material to produce a minimalist work. We explore examples from the contemporary orchestral repertoire such as Varese through to experimental Japanese noise musicians and experimental composers such as Lucier. In this way the students gain an understanding of the continuum of expression through sound and ceased to see strong divisions between ‘music’ and these creative and expressive outputs. The course encourages them to step away from their daily electronic music practices to really develop a different, objective view of music and to understand frequency and time...
domains and sound with much greater acuity. It also helped breakdown often naive and ill-informed judgments about music that is unfamiliar and give the students a point of reference, fundamental to all sound and music work rather than specific to a genre.

Many of the finished works from this class have been very inspiring.

Within the Hybrid Digital Ensemble class (http://gallery.digitalculture.asu.edu), all students are required to produce a performance work that uses an alternative interface or instrument. The interfaces range from Nintendo WiiMotes, to video tracking and motion capture to Wacom drawing tablets and other expressive input devices. This class concentrates on how the computer may be a performance instrument, and the importance of gestural input as both excitation and control of musical material in real time, and how these concepts are communicated to an audience during performance. There is considerable literature around questions pertaining to authenticity and validity of laptop music performance, which become the focus of discussions in this class. The performance works are presented to audiences at both the digital culture showcase (an end of semester showcase) and at a major venue in the community such as the Mesa Arts Center. These concerts are open to the public and have been extremely well attended. The students report learning a great deal about new performance practices and about understanding the computer as a musical instrument and tool. Many of these students have also joined or now contribute to the ASU Laptop Orchestra (LOrkAS http://www.lorkas.org).

2.2 School of Music

The computer music studio is a space where one works closely with sound - all types of sound: both natural and synthetic. Gaining a deep understanding of sound itself and its relationship to both space (physical properties) and the environment (contextual properties) is an essential skill in the process of becoming an artist working in electronic music. Through hands-on exercises and lab assignments, the teaching objective is to introduce audio and sound design techniques as well as the conceptual underpinnings for creating music and sound that engage with both indoor and outdoor space. Additionally, introductions, discussions, and reviewing of current and historical projects that reflect the methodologies covered in class are held. Techniques covered in class include audio synthesis, studio recording, and field recording, and mixing for various multichannel setups.

2.3 IAP

Recognizing the importance of collaboration, sound classes often combine with classes in visual arts or performance for projects. The 100-level classes in Sound Art and Interdisciplinary Digital Media develop works for an annual exhibition entitled “Call and Response” by sending files back and forth; visual art responding to sound art and vise-versa as work progresses. In the Digital Interactivity class, which focuses on embodied interaction using the widest possible range of hardware interfaces to Max/MSP for audio and video synthesis and manipulation, students work with performers in the Contemporary Performance class to develop works for movement and interactive electronics.

In many other classes, such as Art and War, Language, Culture and Performance, which are more theoretical and historical, students are free to respond to an assignment topic using their chosen media or art-form. Being a small program allows students to work very closely with faculty members on developing portfolios of work to help their employment and/or graduate research possibilities. It also enables activities like developing Arduino projects that would not be possible in programs with large class sizes.

Classes that are primarily sound based include the aforementioned Sound Art class, Studio Recording, Audio Production, Sound Performance, and Acoustic Ecology. In addition to the “Call and Response” pieces developed in Sound Art, students work on creating music in the acoustically natural environment and sound pieces for video, games, and other media.

Studio Recording explores acoustics, psychoacoustics, and recording studio technologies in largely non-mathematical ways. Students then apply this knowledge to the production of studio recordings of their own choosing where a large amount of peer assessment of work in progress. Peer assessment and critique is an important aspect to working with sound in IAP. Learning to give and take critique is one of the most important aspects of creating visual art, and something that is often undervalued in teaching sound and music making.

Audio Production focuses on sound for image. Studies of theories by Michel Chion and others form the basis creative for experiments in the aesthetics of sound when combined with image. Sound Performance students create their own instruments, both physical and software, and compose graphic scores and devise performance strategies for ensemble. Acoustic Ecology investigates the relationship between audio art and ecology. It covers field recording, oral histories, and encourages students to develop websites with audio databases.

3. AME GRADUATE RESEARCH

Graduate research in AME (http://research.ame.asu.edu) focused around interactive systems and new tools and approaches for acoustic ecology. Two case studies for interactive systems represent the breadth of that work.
Michael Krzyzaniak is a PhD student in Media Arts and Sciences at Arizona State University. He is studies aesthetically complementary interactive music synthesis. This involves building systems that generate music in response to a human, where the system takes aesthetic context into account. In one stream of research, he studies this in the context of interactive musical robots, in which robotic musicians collaborate with human musicians. In another research stream, he studies this in the context of reactive dance, in which a computer generates music in response to the movement of dancers. To this end, Michael is developing mathematical techniques for analyzing the movement of dancers.

Courtney Brown is undertaking a DMA in Interdisciplinary Media and Performance between AME and the School of Music. She is developing an Interactive Tango Milonga, which takes the form of an interactive dance system for Argentine tango in the context of social dance allowing dancers to drive musical composition via movement. By giving dancers musical agency this project aims: 1) to immerse dancers more deeply in the music imparting a greater sense of musicality, i.e., how dancers respond to music 2) to increase the sense of connection, the feeling of being at one with one’s partner and the music 3) to generate new ways of connecting all dancers on the floor, via sound 4) to innovate new expressions and structures within the tango tradition. At the core of this project is how internal understandings of musical intentionality and connection are experienced through social Argentine tango dance, and how dynamic movement-sound relationships can be designed to stimulate them.

4. FACULTY

4.1 AME

Faculty research in this field is lead by Dr. Garth Paine and ranges through acoustic ecology (the Listenn Project http://listen.ame.asu.edu) and interactive dance works using motion tracking or bio-sensing of the dancers (see http://bit.ly/1B3FvWR). He is internationally regarded as an innovator in the field of interactivity in experimental music and media arts. He is an active contributor to the International NIME conference and is on the editorial board for the Organised Sound Journal. He lead the Taxonomy of Interfaces/Instruments for Electronic Music performance (TIEM) projects with partners McGill University and the Electronic Music Foundation, resulting in an online database of current practice and opening up the discussion of a taxonomy for classification of new instruments to assist research in the field.


Todd Ingalls is a media composer who works with interactive performance and experiential media systems. He is currently Associate Professor of Research in the School of Arts, Media and Engineering at Arizona State University where he also serves as Assistant Director. His research focuses on gestural communication and embodied media interaction, affect in music, and algorithmic media composition as well as novel mediated environments for stroke and Parkinson’s disease rehabilitation. He is involved in both the Mixed Reality Rehabilitation and Participatory Culture groups at AME.

His research has been published/presented in venues such as the International Computer Music Conference, ACM Multimedia, DAFx, IEEE Engineering in Medicine and Biology, National Dance Education Organization, Leonardo Electronic Almanac, Lecture Notes in Computer Science, and IEEE Signal Processing Magazine.

Other AME faculty include:

Chris Ziegler, interactive dance and environments
David Tinapple: Interactive media installation
Grisha Coleman, Somatic movement and dance
Sha Xin Wei, Media environments
Loren Olson, Processing and Programming
Pavan Turaga, Electrical Engineering with a focus on image processing

and other experts with a wide range of backgrounds and expertise.

4.2 School of Music

Kotoka Suzuki conducted a research residency at the Center for Arts and Media (ZKM) in 2013 on the relationship between timbre and space in a spatialized listening environment. Following this residency she has continued to investigate these relationships in her recent work. Currently, she is working on a commissioned work for the Arizona Contemporary Music Ensemble for chamber ensemble and electronics where timbre directly affects how the sounds are projected into space. The work will be premiered at the New Music Festival at Arizona State University in November 2015. She also has a long-standing interest in incorpo-
rating visual elements in her work and has collaborated with several visual artists in producing new work. She is currently completing the music/sound for the video “Drama” by the visual artist, Geof Oppenheimer, about a ghost story of capitalism. This work will be exhibited at the Block Museum of Northwestern University in September 2015 as part of the solo exhibition Big Boss and the Ecstasy of Pressures.

4.3 IAP

IAP faculty researchers focused primarily on sound are Richard Lerman and Barry Moon. Richard Lerman is famous for his work with piezos and self-built transducers in producing sound, video, and installations that highlight issues in sustainability and environmental and social concerns.

Barry Moon, known to some for his “Baz Tutorials” YouTube series, creates pieces utilizing live audio/video processing. He has long been interested in encouraging greater interaction between humans and computers, which has been the impetus for his compositions using open scores and improvisation frameworks. He is now working towards using machine-learning and generative algorithms to realize the next level of interaction.

Other IAP faculty include:

Arthur Sabatini, performance studies and arts aesthetics researcher and practitioner,

Patricia Clark, video artist,

Marianne Kim, performance artist and dance videographer,

Theresa Divine, games theorist and practitioner,

and other experts with a wide range of backgrounds and expertise.

5. FACILITIES

5.1 AME

Facilities include the iStage, interactive immersive rich media stage, an 8 channel surround sound studio, video and audio editing and composing facilities and a range of interface and hardware appropriate for such research. Students are provided individual work spaces and access to fabrication labs including 3D printing, laser cutters, wood and metal workshops.

5.2 School of Music

The School of Music houses three electronic music studios. Studio 1 contains equipment and software necessary for recording, MIDI sequencing and creation of computer music for four-channel output. Studio 2 is an analog studio that contains a wide range of vintage equipment, including analog synthesizers and a multi-track analog tape recorder. Studio 4 utilizes equipment for mastering and creating computer music in 8.1 surround.

5.3 IAP

Facilities include a 24-station computer lab with commercial and experimental software packages, a recording studio with ProTools HD, C|24, 5.1 monitoring, and several performance and video production spaces.

Figure 1. Students working in the IAP recording studio

6. EVENTS

Digital Culture holds a weekly Symposium Titled the DC Studio, with visiting speakers from industry, sciences and the arts (https://blog.digitalculture.asu.edu/?q=dc-studio). Recent speakers have included: Doug Quin (Syracuse, Ed Osbourne (Brown), Leigh Landy (DMU), Tim Place (Cycling 74), Alvin Curran (Rome), and Annea Lockwood. At the end of each semester, the DC undergraduate and AME graduate student produce a DC Showcase of current work – some of these works can be seen in the DC Online Gallery (http://gallery.digitalculture.asu.edu).

IAP hold regular shows in its gallery and theater spaces. Many of these events either feature student work or have students assisting faculty with their work. The biennial “Southwest Electronic Music Festival” hosts national and international composers and performers for a weeklong series of performances and workshops. The 2014 festival hosted Stephen David Beck (LSU), Kostas Karathanasis (OU), and Leigh Landy (DMU).