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Interactive Computer Music for Double Bass

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Interactive Computer Music for Double Bass

By Jeremy Baguyos

The rise of the academy as patron of art music, the philosophical underpinnings of "futurists" like Russolo and Busoni, the increasing power and cost-effectiveness of computer-based systems and the new compositional directions of the Post World War II avant-garde have all contributed to establishing the genre of electroacoustic music in the United States. Composers have increasingly turned to electronics for new source material and as a result, there is an entirely new repertoire that was generated to take advantage of the emerging technologies and aesthetics. For the double bass, this new repertoire included compositions like Jacob Druckman's Synapse/Valentine (1969), Charles Whittenberg's Electronic Study II (1962), and Donald Erb's Basspiece (1969). In recent decades, composers have added to the repertoire. Many composers should be recognized for their contributions to electroacoustic double bass repertoire, but some merit more than a passing reference. Of particular interest are Death of Desdemona (1987) by Frank Proto, Moby Bass (1975) by David Neubert, Birth of Venus (1990) by Christos Hatzis, Three Pieces for Double Bass and Tape (1990) by Orlando Jacinto Garcia, Radio Sonata (1982) by James Sellars, and Mist (1997) by Robert Gibson. Additionally, a number of double bass soloists have championed the cause by commissioning, promoting and regularly performing electroacoustic music. Two of the most prominent double bassists in this repertoire are Bertram Turetzky and Robert Black.

The compositions mentioned in the preceding paragraph are tape pieces or fixed medium pieces, where the electronic part is realized electronically and stored for future use.
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suit for a solution has resulted in a new sub-
genre of electroacoustic music. The new
approach has been called "real-time computer music performance" or "interactive
computer music performance" or "interactive
electronic music performance," or some
other permutation. The biggest difference
between the newer flexible approach and the
older fixed medium approach is that the new
electronics (almost always with the computer
as intermediary, hence the name computer
music) are able to react and adjust to the
performer, in addition to the performer
reacting and adjusting to the electronics. As
clique as it sounds, this creates a whole new
frontier of possibilities. In the same way that
new musical systems liberated sound, now
new interactive computer music systems are
able to liberate the performer.

It must be mentioned that the first computer
music systems (not analog synthesizers)
date as far back as 1968. The invention of the
MIDI protocol in 1983 for communication
between electronic musical instruments and
devices allowed for a level of interactivity in
terms of control of MIDI instruments, but
MIDI did not represent important musical
information like the nuances of timbre that
are so important to the Western art music tra-
dition. As recently as 1993, Robert Black and
Richard Zvonar collaborated on the perfor-
ance of Two In Hand, which had a high
level of interactivity even by today's stan-
dards. Composer and double bassist Curtis
Bahn has also been one of the pioneers of
interactive computer music and continues to
perform and record his own interactive
computer music compositions with his electronic
chamber ensemble, Interface.

The implementation of interactivity in
contemporary electroacoustic music is
facilitated through software in a music-pro-
gramming environment called MAX/MSP.

MAX/MSP in the simplest sense is an
object-oriented programming language. It
is a high-level programming language, but
the programmer/musician does not need to
know the inner workings of machine lan-
guage, assembly languages, or even intu-
tive text-based languages like C. The pro-
gramer/musician does not need to worry
about a compiler or interpreter, nor does he
need to know the inner workings of the
source code. Instead, the programmer/
musician needs only to know about
MAX/MSP objects and what they can do
for the musician: namely what the machine
accepts as input, what it outputs, and what
is supposed to do. A diagram of the rela-
tionship between MIDI data or audio signal
flow and the other "objects" with which it
connects/interacts is provided.

A MAX/MSP program can be as esoteric
as the most complicated C++ code (a com-
puter programming language), yet it can be
used by the most technophobic of tradition-
al musicians if the MAX/MSP programmer
designs a user-friendly interface. In addi-
tion, the purchase of the full version of
MAX/MSP is not required to run a
MAX/MSP program. The run-time envi-
ronment for any MAX/MSP program can
be downloaded for free from the web site of
Cycling74, the manufacturers of
MAX/MSP. If a musician wants to program
as well as run MAX/MSP applications, a
full version of MAX/MSP can be "auditioned" for 30 days by downloading it from the
Cycling74 site. After 30 days, the soft-
ware requires a password challenge that
only a full-paying license owner will have.
The MAX/MSP programming environment
currently only runs on the MAC OS 9 and
MAC OS X operating systems, but a com-
mercial version for Windows is being
developed and its release is anticipated.

Over the last few years, I have been inti-
mately involved with the creation and per-
fomance of MAX/MSP patches for interac-
tive computer music for double bass. Some
current and past projects include the imple-
mentation and realization of Andrew May's
Ripped-up Maps (1997/2003) for Solo
Instrument and Computer, Robert
Hamilton's Museau de Singe (2003) for
double bass, piano, and interactive computer
electronics, and Conversations on the Nature
of Life (2003) which was composed by an
intermedia collective consisting of Robert
Hamilton (composer), Jeremy Baguyos
(bassist), Leo Duborobsky (biophysicist),
and Levon Lewis (spoken-word artist).

May's Ripped-up Maps for Solo
Instrument and Computer was originally
written in 1997 as an improvisation envi-

use on a fixed medium like analog elec-
romagnetic tape (cassette or reel-to-reel),
Digital Audio Tape (DAT), or Compact
Disk (CD). The electronics are fixed and
not in real-time while the double bass part
is expected to be played "live." In a sense,
the tape and the live bassist play a duet.
Though the tape as chamber music partner
never argues with the bassist in rehearsal,
there is the obvious drawback of the inflexi-
bility of the tape in musical collaborations,
something that could be perceived as sterile
and/or confining. But there are many inge-
rious conventions that composers use to
allow the performer to have more freedom
when collaborating with the tape. One is to
write vaguely defined ambient sections of
music. But no matter the ingenuity of the
composer, there is always the danger that
the tape plus bassist performance combina-
sion sounds like it was written for a CD to
be played in a home stereo system or the
performance comes across as a music-
minus-one performance.

This problem is obviously not unique to
double bassists, since other instrumentalists
have wrestled with the problem and the pur-
suit for a solution has resulted in a new sub-
genre of electroacoustic music. The new
approach has been called "real-time com-
puter music performance" or "interactive
computer music performance" or "interactive
electronic music performance," or some
other permutation. The biggest difference
between the newer flexible approach and the
older fixed medium approach is that the new
environment for solo violin. It was modified in 2003 for use by any instrument, but the author requested its modification specifically for double bass. For this piece, there is no traditional musical score. Instead the score reads something like an application software manual. It provides details for the hardware and system software requirements to run the improvisation environment, instructions for the engineer and instructions for the musician. And the piece itself is a vehicle for improvisation. *Ripped-up Maps* captures the player’s improvisations and stores them in memory buffers. As the player continues to improvise, the computer begins an algorithmic playback of complex, digitally processed samples of the player’s improvisations. The computer responds to what the player is currently improvising by tracking the player’s pitches, amplitudes, and amount of rhythmic activity. After the computer quickly tracks and analyses (with the fiddle> object) what the player is doing, it then responds by putting out sound according to composer/programmer-defined algorithms. In this case, composer/computer musician Andrew May has defined the algorithms. This is where the interactive computer music parts company with the fixed medium pieces of the past, because the piece is different for each performance and the computer and performer interact freely with each other in real-time.

Robert Hamilton’s *Museau de Singe* is a MAX/MSP patch published with sheet music, and it was written specifically for the double bass as the solo instrument. There is a traditional score and a very user-friendly interface that requires almost no knowledge of MAX/MSP. Hamilton’s work captures the bassist’s acoustic performance of the musical score in real-time and processes that sound as the performer continues to play. Like *Ripped-up Maps*, the Hamilton work uses the live sound of the double bass as source material for the computer’s response to the musician’s performance. The piece also uses “spatialization” effects, sounds which are produced through four speakers. There are two versions of this piece. One version is fully automated, after the bassist presses a button and begins to play the piece from the traditional score, the computer takes care of itself. The other version involves a laptop player on stage with the bassist. While the bassist is performing, the human laptop player can control the digital signal processing in real-time.

The human laptop player can control every aspect of the real-time processing including panning, amplitude, sample playback, types of processing, timbre, and pitch. The complete version of Hamilton’s *Museau de Singe* was premiered at the Peabody Conservatory of Johns Hopkins University on May 6, 2003.

*Conversations on the Nature of Life* is a performance-piece for spoken-word, real-time computer processing, contrabass, and video which seeks to address issues regarding the biological and sociological building blocks that make us human. Onstage are a spoken-word artist and a double bass player. A computer audio application prompts the spoken-word artist with questions, culled from a U.S. Government survey. The questions are presented in a random order with a variable interval of time in between each successive question, during which time the performer will answer. Through MAX/MSP the audio of the questions will be presented as an audio signal convolved, or mixed together, with sounds from a double bass. The musical gestures provided by the double bassist are driven by text from the spoken-word artist and by text from the letter codes for the amino acid bases. The music for the double bass is semi-improvised and processed through MAX/MSP. On a screen behind the performers is a video screen showing image of a 3-dimensional protein structure: a rotating bacteriorhodopsin protein. The image starts with a single amino acid and slowly develops into its full shape. But the speed and display of the entire video production depends on the speaker’s voice. At the start of the piece, the screen is blank. As the speech progresses, a 3-dimensional image of the protein is built on the screen behind the performer. When the protein has been completely built, the piece is finished. The integration of the video is facilitated through Jitter. *Conversations on the Nature of Life* was realized at the Digital
Media Center of the Mattin Center of Johns Hopkins University and was premiered on May 9, 2003 at the Swirnow Theatre in Baltimore, MD.

The long-term implication of MAX/MSP might be considered to be “artificial intelligence” in musical performance. When a musician/programmer composes/programs a MAX/MSP patch, that musician/programmer is creating a crude but artificially intelligent musical partner that can react to a human musician. As software and hardware continue to develop at breakneck speeds, MAX/MSP parches are evolving into chamber music partners. It might seem like a far-fetched notion that computer geeks would talk about at science fiction conventions, but the electroacoustic music tradition is moving towards ushering in an artificially intelligent computer musician that will play along side its human counterparts in the not-too-distant future.

After holding full-time posts as Principal Bassist with the Orchestra Filarmónica de GC (Spain) and as second-chair bassist with the Shreveport Symphony, Jeremy Baguyos maintains a full schedule as a freelance double bassist in the Washington, DC area, and also subs with the Milwaukee Symphony. He has performed with the Kennedy Center Opera House Orchestra and the National Symphony in addition to his electroacoustic pursuits with the 21st Century Ensemble and the Modulus Ensemble. He was on the regular faculty of Grambling State University and Indiana-Purdue University at Ft. Wayne. Baguyos received his Bachelor of Music from the Indiana University School of Music where he studied double bass with Bruce Bransby and attended the Peabody Ensemble. He was on the regular faculty of Grambling State University and attended the Peabody Institute of Johns Hopkins University where he studied computer music. His hobbies include dachshunds, running, and readings in the humanities.

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