

# EASTMAN COMPUTER MUSIC CENTER

## *25th Anniversary Concert Series*

OCTOBER 2006 • MAY 2007



EASTMAN COMPUTER MUSIC CENTER  
at the EASTMAN SCHOOL OF MUSIC  
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# TABLE OF CONTENTS

A (not so brief) History of the Eastman Computer Music Center (1981 - 2006) Allan Schindler	02
The ECMC 25th Anniversary Concert Series	21
ECMC Alumni	29

Setup



search-for-path  
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# A (not so brief) History of the Eastman Computer Music Center

1981 - 2006

*(wherein will also be found sundry opinionated observations)*

Allan Schindler, Director

## THE EARLY YEARS: 1979 - 1982

♪ The origins of the Eastman Computer Music Center can be traced back to 1968, when Wayne Barlow, professor of composition, founded an electronic music studio at the school.<sup>1</sup> By the end of the 1970s, when Wayne retired and I was hired to update and expand the electronic music program, the Eastman electronic studio consisted of three rooms that each contained a large, modular Moog1 analog synthesizer and two or three stereo reel-to-reel tape recorders. The tape recorders were used not only to record the output from the Moogs, but also for tape delays, tape loops, and other sound modification procedures.

♪ In the fall of 1979 Professors Joseph Schwantner and Aleck Brinkman and graduate student Robert Gross joined me in undertaking a fact-finding study of the newest resources in electronic music production and the emerging field of digital audio. Because of the high cost of purchasing and maintaining electronic audio equipment, most electronic music studios in the US were in universities, colleges, and conservatories, and most, like the Eastman studio, consisted entirely of analog equipment. At a few pioneering computer music studios, such as those at Stanford, Princeton, Columbia, and Illinois, composers were making music by programming large mainframe computers that usually were shared by several university departments. Given the five mile distance between Eastman and the University of Rochester River Campus, the prospect of constant commuting to piggyback on a university mainframe computer was not appealing.

♪ During this time digital synthesizers such as New England Digital Corporation's Synclavier, played in real-time with plastic piano-type keyboards (the forerunners of today's MIDI keyboard controllers) were beginning to come into vogue. We seriously considered a Synclavier based developmental plan for the studios. Most Eastman composition majors at this time had good or serviceable piano skills, and we had no doubt that most of them would find playing a polyphonic piano-type keyboard more intuitive than typing long lists of numbers on a computer terminal keyboard. Additionally, although the cost of a well equipped Synclavier system exceeded \$30,000, this was less than half the cost of most alternative types of digital and hybrid analog/digital systems of the period. However, all four of us were dissatisfied with what we perceived as a limited timbral palette (mostly imitative of orchestral instruments) of the Synclavier, and with the characteristic FM

“signature” (identifiable sonic quality) of its sounds.<sup>2</sup>

¶ During a “field trip” we made to MIT, Barry Vercoe graciously demonstrated for us another possibility that he had implemented in the Media Lab at the school. Barry had written a sound synthesis programming language called Music 11 that ran in assembler code on the PDP-11 series of 16 bit mini-computers manufactured by the Digital Equipment Corporation (DEC). Because these mini-computers were much smaller and less expensive (albeit also much less powerful) than mainframes, they could be dedicated to particular tasks, such as making music. A mini-computer could be housed in a normal room rather than in a frigid climate-controlled terrarium, and could be maintained by a small staff. Most importantly, sophisticated, processor-intensive music software such as Music 11 (the forerunner of Csound), derived from the pioneering work of Max Mathews, Jean-Claude Risset, John Chowning and others, could be run on a mini-computer at any time — not just during the wee hours when computer loads dipped on time-shared mainframe systems). And when the computations were done, the resulting sound files could be played immediately rather than copied to digital tape for later conversion.

¶ Given the choice of accessibility and ease of performance and maintenance (exemplified by Synclavier systems) versus extensibility and quality of sounds (mini-computer systems), we opted for the latter. There would be many times in the next few years when we would wonder why we had voluntarily subjected ourselves to so much aggravation.

¶ In 1980 we installed a PDP-11/34 computer, initially fitted with 128 KB (sic) of RAM, along with analog/digital and digital/analog converters and other necessary audio hardware. However, it would be nearly a year before this system become sufficiently functional to support classroom instruction, and the first substantial musical works did not begin rolling out until 1982. The PDP-11, the size and weight of a good sized refrigerator, was often unstable, sometimes crashing several times each day, and the installation of new hardware circuit boards often took several days or weeks of work. Robert Gross, who held a staff position at Eastman between 1980 and 1982, handled the administration of this system and wrote most of our initial music software utilities for editing, mixing and manipulating sound files. Robert eventually went on to do important work in digital audio at the Skywalker Sound division of Lucasfilm Ltd. and at Microsoft. When he left in 1982, graduate student Craig Harris took over administration duties on the PDP-11. Aleck Brinkman, who, like Robert, had learned computer music programming techniques at Dexter Morrill’s studio at Colgate University, completed his Score11 score file preprocessor during





this period. For several years the PDP-11 serviced Aleck's Music Theory programming classes in addition to its computer music functions.

♪ Despite the frail constitution of the PDP-11, we eventually got a lot of mileage out of this system. It was used to record sounds from about twenty percussion instruments, the beginning of our sflib ("soundfile library") collection of sound samples that today includes several gigabytes of source material for compositional and performance use. The initial versions of many of the programming utilities still in use today on ECMC Linux systems (and, to a lesser extent, on ECMC Windows and Macintosh systems as well) were coded on the PDP-11.

♪ Realization of compositions on this system could be agonizingly slow. Sound synthesis, processing, and mixing operations that today can easily be accomplished in real time often required hours of number crunching. By 1983, however, composers such as Craig Harris and JoAnn Kuchera-Morin were realizing musically imaginative, technically innovative compositions that achieved widespread recognition, and the ECMC studios were internationally known as an important center for electroacoustic music. Robert Morris' Exchanges, written for pianist David Burge, was performed by Burge fifteen times at venues across the US.<sup>3</sup> Two of the works that I realized on the PDP-11, written for Robert Sylvester and John Marcellus and computer-generated sounds, were performed widely, published and released on commercial albums. Collaborative projects between composers and performers have been a hallmark of the ECMC studios from these early days to the present.

### 1983 INTERNATIONAL COMPUTER MUSIC ASSOCIATION CONFERENCE

♪ Between October 7 and 11, 1983 the ECMC and Eastman School hosted the 1983 International Computer Music Association conference (ICMC), attended by more than 200 musicians, researchers and developers from North America, Europe, and other continents. In addition to several concerts and numerous paper sessions, the conference featured music and lectures by special guests Jean-Claude Risset and John Chowning, a keynote address by James A. Moorer, tutorial sessions, panel discussions, demonstration tours of the ECMC studio and an installation with continuous playing of important electroacoustic works. Concerts included new works by Paul Lansky, Charles Dodge, Horacio Vaggione, Morton Subotnick, Kaija Saariaho, Carla Scaletti, Dexter Morrill, Trevor Wishart and many others, and superb performances by Eastman faculty and student soloists and the Musica Nova ensemble directed by Sydney Hodkinson. Paper sessions included presentations by Barry Vercoe, Lejaren Hiller, John Strawn, James Beauchamp, Curtis Roads, Julius Smith, Miller Puckette, Stephen Pope, Roger Danenberg,



F. Richard Moore, Barry Truax, and many other important researchers and developers.<sup>4</sup>

¶ During the formative years of the Eastman computer music studios we received generous and gracious technical assistance from many developers and musicians in the field, from several other computer music centers, and from individuals and departments within the University of Rochester. (It was especially helpful when we were assisted in becoming a node on the arpanet — a forerunner of the internet — during the early 1980s.) For me, serving as Director of the 1983 ICMC, and for staff members Craig Harris, JoAnn Kuchera-Morin, Marcia Bauman, and Denise Ondishko, who labored for several months to produce this conference, it was a privilege to be able to give something back to the field.

### THE MIDI STUDIO

¶ Throughout the 1980s and the early 1990s there was a sharp distinction between the methods used to create music in the two ECMC studios, which at the time were called the direct synthesis studio and the realtime studio. In the direct synthesis studio (room 52), all sounds were computed on Unix computer systems — initially on the PDP-11, then on its successors, a cluster of Sun-3 workstations and, beginning in 1989, on NeXT workstations. Detailed specifications for fragmentary passages of music were entered at a computer terminal, then computed, then played, revised, recompiled and played again numerous times, then eventually mixed together in software and recorded to a digital recording device (initially a Sony FC-1 recording systems, and then beginning in the mid 1980s, to DAT).

¶ The realtime studio (ECMC room 54), by contrast, was designed to facilitate musical performance. Compositions were constructed by playing musical passages on piano-type keyboards connected to hardware synthesizers. Our first digital synthesizer, a hulking Kurzweil K250 obtained in 1985 through an anonymous gift, was a remarkable instrument for its time, enabling one to play up to 12 notes at once and to digitally record what was played into an internal sequencer that could hold up to 12,000 notes. However, it was not easy to edit or modify these sequences.

¶ By 1984 we had begun experimenting with MIDI communication between the K250 and a sluggish Apple II computer system. Only in 1987, however, when we installed a Macintosh Plus computer (1 MB RAM, 8 MHz CPU) running Opcode's Vision software sequencer





connected to a Yamaha dx7 II synthesizer did we obtain musical results in which our users took pride.

¶ MIDI had become the basis for most of our realtime applications, and the “realtime” studio became known simply as the MIDI studio. By 1992 the studio contained four digital synthesizers — a Kurzweil K2000, a Korg Wavestation, and two dx7s — as well as an array of (mostly digital) outboard processing gear, such as a delay line, Lexicon reverb unit, and a Bose frequency shifter.

### COMPOSING & PERFORMING MUSIC

¶ The ECMC MIDI studio has never been designed to facilitate or encourage MIDI emulations of orchestral or acoustic instrument performances, but rather to provide support for new, interactive approaches to the composition, performance, and perception and enjoyment of music. Most current ECMC users are far less impressed by a 30 GB library of orchestral instrument samples with 16 velocity layers and a choice of 400 effects plug-ins than by a simple but ingenious “patch,” written by one musician, that treats a familiar sound source or a fragmentary rhythmic or pitch pattern in an imaginative, unexpected, or uniquely expressive manner. Eastman has always had an abundance of artistically and technically gifted instrumentalists and singers. Personally — and I think speak for almost all ECMC users — I have no interest in trying to imitate acoustic performing ensembles, or in the substitution of technological shortcuts for the assured musicianship of the fine players around us.

¶ Despite the numerous collaborations between ECMC composers and Eastman performers during the 1980s, there was, by the end of the decade, still a lingering suspicion among some performers that “these computer guys want to put us out of work.” I believe that one of our most rewarding accomplishments since that time has been the continuous increase in usage of ECMC resources by instrumentalists and singers. Today, nearly half of the twenty to thirty students who use the ECMC studios each year are performers. Over the past dozen years, performers who have been affiliated with the ECMC studios, including percussionist Patrick Long, saxophonist Randall Hall, trumpeter Jason Price, singer Heather Gardner, marimbist Nathaniel Bartlett, and others have made their mark as performing artists who employ computer music resources to extend the technical and esthetic range of their musical craft.

¶ Interactive compositional and performance software applications used in the ECMC studios, beginning with M in the late 1980s, then



MaxMSP beginning in the early 1990s, and including PureData (PD), which many of our users have employed during the past five years, have had a lot to do with this greater involvement by performers, and with collaborative or interactive projects between composers and performers. In such jointly realized projects, the traditional “I write it, you play it” roles are not so clearly delineated. Sometimes there is considerable creative overlap, as there was in many earlier periods of Western musical history and as exists in jazz and rock and in most world music cultures, between inventing (“composing”) music and performing it. Several of the works included in the ECMC 25th Anniversary Concert Series exemplify these types of collaborative processes.

### “PLUS ÇA CHANGE, PLUS C’EST LA MÊME CHOSE”<sup>5</sup>

¶ The explosive growth of digital technologies during the 1990s and into the present century is familiar to all of us. Miniaturization of digital circuitry, rapid increases in computing speed and power, and the commoditization of computing hardware (and resulting sharp decline in prices) have made prodigious computing power widely available for musical purposes. Change has been rapid, and the best hardware platform or software application today may no longer be the most efficacious, suitable, or cost efficient choice in two or three years.

¶ Former ECMC users who return for a visit after several years sometimes remark, “I don’t recognize the place.” Over the past twenty years our Unix-based software has migrated from Sun (1984) to NeXT (1989) to SGI systems (1994) to commodity hardware running GNU/Linux and open source software (2002). In the MIDI studio we abandoned the Macintosh platform entirely for a while. In the years around 2001, immediately before and after the introduction of OS X, we experienced increasing incompatibility and instability problems with our Macintosh music software, particularly with the driver for ProTools. We were also dissatisfied with the high cost and mediocre performance of Macintosh hardware during this period, and so shifted our MIDI studio operations to Windows systems. This platform migration was not a simple or joyous operation (we lost important applications such as MaxMSP), but it did produce a palpable sense of relief within the studio that musical issues could again become paramount, and we could return to productive work.

¶ Time passed. Macintosh hardware improved, and OS X matured into a robust operating system with excellent audio and MIDI applications too important to be ignored. For the last four years Macintosh and Windows systems have co-existed amicably as joint resources in the



MACINTOSH PLUS, C. 1988

NEXT CUBE, C. 1989

MIDI studio. Most commercial music applications today are available in Macintosh and Windows versions, and our software base on these platforms is very similar.

¶ Similarly, our principal MIDI and audio software sequencing application has changed several times — from Studio Vision to Digital Performer to Logic to Cubase. And within just a few years we migrated from ProTools to Nuendo to simpler applications with a sharper focus on the particular types of editing, processing, and mixing operations required for the types of projects most often created in our studios.

¶ The transition of our Unix music software base from proprietary SGI workstations to open source GNU/Linux systems between 1998 and 2002 was perhaps even more arduous than our Macintosh hiatus. More than three years of developmental work in shared library and device driver hell elapsed before our Linux system madking (an apt name during this period) became as usable as its predecessors.

¶ Amidst all of this change, however, we have tried to maintain the original focus of the ECMC, and never allowed the technology itself to become more important than the musical creativity and expression that it should serve. Digital technology is simply a set of tools — the principal tools of our age. When applied to music and the arts with insight these tools can serve, and sometimes even liberate, musical creativity and imagination. But if emphasis shifts to the technology itself, as manifested in a slavish desire to follow “industry standards,” bloated software with hundreds of features that no one uses, or academic courses devoted solely to using a particular software application rather than to musical issues elucidated by it, then this same technology can get in the way of artistic creativity and take the fun out of making music.

### ART & TECHNOLOGY

¶ Professional colleagues and prospective students sometimes are surprised to discover that there is no academic major, or minor, or even concentration, in the area of “Music Technology” or computer music at Eastman. The reasons for this decision have been encapsulated above. We believe that there are important and exciting applications of computer technology available to composers, to performers, and to music theorists, scholars, and educators. But the emphasis should always be on excellence in composing, in performing, in scholarship, and in pedagogy.

¶ The creation of electroacoustic music is a much faster and technologically easier process today than it was ten or twenty years ago, and the acoustical quality and clarity that can be achieved today is appreciably better. But the very best music being made with today's improved tools is probably no "better" than the most imaginative music created more slowly (and therefore, some would argue, more thoughtfully) during the infancy and adolescence of electronic and computer music techniques. And, owing to the low cost and easy availability of computer music resources today and the resulting exponential increase in the sheer number of musical works created with these resources, the "signal-to-noise" ratio (the ratio of exciting, engaging, thought-provoking works to forgettable and derivative compositions and performances) is probably "worse" today than twenty or thirty years ago.

¶ (The preceding paragraph sounds uncomfortably like the grumpy remonstrations of an aging geezer lamenting the good old days when you really had to work to create electroacoustic music. Hmmm.)

¶ Music that is fresh and alive generally reflects not only certain values, paradigms, and issues of its time, but also the technologies of its period. I feel very fortunate to have access to the powerful digital audio and compositional tools available today. But access to "bigger, faster, easier" technologies rarely, in itself, leads to the creation of "art that makes you smile inside." At best, technology can only open potential windows to artistic discovery, which often remains a slow, challenging, unpredictable and therefore all the more fascinating a process. On the other hand, any potential window to artistic discovery is hardly to be disdained.

## DRAWING CLOSER

¶ Over the last fifteen years, clear-cut differences in working procedures and capabilities in our two studios have narrowed considerably and in certain areas practically disappeared. During the 1990s very high quality Macintosh and Windows music software became available from commercial vendors. Many types of sound synthesis, signal processing, editing, and mixing operations formerly possible only on high-end Unix workstations became usable on cheaper commodity PCs. The Macintosh itself became a Unix workstation under the hood.

¶ Powerful sound processing applications such as Reaktor, SuperCollider, and the Composers' Desktop Project as well as highly extensible signal processing applications and plugins have become an increasingly important part of the resources of the MIDI studio. In reality,



the term “MIDI studio” has become too restrictive, belying the much broader range of applications and projects now serviced by this studio. Many user projects consist primarily of mixing sounds created by synthesis and sound modification techniques — procedures similar to those being employed in that “other” studio around the corner.

¶ Over in room 52, a majority of tasks now are performed in real time, often with mouse-based graphical applications similar to Windows and Mac GUIs, sometimes with MIDI input, sometimes with no direct sound synthesis. The term “direct synthesis studio” became anachronistic several years ago, and we generally refer to this studio simply as the “Linux studio.”

¶ In addition to the increasing overlap in functions between the studios, the computers in these studios have been physically linked for several years. All nine of our desktop computer systems are connected by high speed (gigabit) Ethernet LAN hardware, enabling users to “fly” projects and sounds between computer systems. A recording of a saxophone made on Macintosh system “wozzeck” may be moved to Linux system “madking” for sound modification, mixing with synthesized sounds and multi-channel spatialization, and then transferred to Windows system “gesualdo” for recording to a DVD-Audio disc. There are no longer “walls.”

## TWO APPROACHES TO SOFTWARE AND TO MAKING MUSIC

¶ Though walls may have tumbled, there remain some important and salutary distinctions between the two ECMC studios. Although the tasks performed in these studios are sometimes quite similar, the manner in which they are performed is often quite different. And the choice of what method or approach one adopts to perform a procedure can have a profound effect on the kinds of expressive and structural possibilities that present themselves, and thus on the final musical results.

¶ In the MIDI studio we strive to provide the best commercial Windows and Macintosh audio software and hardware for the types of creative projects that the studio is designed to support — projects that encourage musical innovation and imagination, rather than imitation, as well as technical excellence. This is not necessarily the same audio software and hardware one is likely to find in a commercial recording studio or postproduction house. It is important for students to become familiar with representative examples of popular professional music software applications because these applications are widely used, and therefore comprise benchmarks against which one can assess the merits of newer and alternative types of music software. Moreover, many of our students — especially those who go on to do commercial film and television work, work in recording studios, or teach in schools where the curricula prepare students for these types of career paths will be expected to be thoroughly familiar with the “industry standard” tools of digital audio production.

Many of the most widely used commercial musical applications are designed as comprehensive packages, incorporating tools commonly used at various stages in the evolution of a musical project, with an accessible, “easy-to-learn,” professional-looking graphical interface that often emulates the look of hardware audio equipment. Most importantly, these applications generally present the user with quick access — often in the form of exploding menus — to many common procedures for tweaking, modifying, and layering individual sounds and complete audio tracks.

¶ Some open source applications unabashedly imitate or borrow from popular commercial titles. But the Unix audio programs and utilities written over the years by ECMC staff for use on our systems (most of which are still in use today), as well as many of the open source musical applications that ECMC users find most useful and creatively stimulating, have a very different paradigm, almost the opposite of the commercial “big tent” model. These programs are intentionally limited to performing one type of operation, or a group of closely related operations, quickly and efficiently. They have a small footprint, loading and executing quickly, and often can be easily interconnected (scripted) or run in quick succession, so that the musical output of one utility becomes the input to another program.

¶ Such modular, optimized utilities enable users to quickly create their own, unique types of signal chains to generate, process, and combine musical material and ideas. Users also are encouraged to create their own programming and algorithmic tools and compositional aids, and to modify or extend existing software for particular new purposes.

¶ In short, MIDI studio users are urged to make fresh and original use of available software (most of it commercial, but some of it open source or shareware). By contrast, Linux studio users are encouraged to develop their own tools.

¶ There are advantages and disadvantages to both of these approaches to music software. Commercial applications, written by professional programmers whose livelihood depends upon widespread acceptance of their efforts, often streamline and standardize procedures for performing common tasks, and often are more intuitive to use (at least initially) and better documented. On the downside, they are frequently overstuffed and slow, too much alike, and suffering from abysmal or non-existent technical support (which makes no money for the vendor) and from obnoxious registration, copy protection, and marketing mechanisms such as hardware dongles, and may grant access to the program to only one user account on the system. Most importantly, perhaps, these applications are proprietary. If you find or suspect a bug or hardware or software incompatibility in the application, or want to extend the utility of the application in some new direction, you will probably be dependent upon the manufacture to address this need. It could be a long wait.

¶ With open source software, the source code of applications is freely available, and can be modified and extended to suit an individual’s needs — either by the

user, if she has programming skills, or by other members of the open source community. Open source software is generally written by users (often by musicians, in our case) in a very active user community that shares information — an environment similar to that of the early days of computer music.

¶ On the other hand, open source software is sometimes more difficult to install and configure than commercial software, is sometimes more hardware-dependent, often doesn't look attractive, varies more widely in quality, and is often poorly documented.

¶ For musicians who learn how to program in order to create their own musical tool chests, conceptualization of musical works and devising tools with which to realize these works can become a continuous, circular process. In the process of working out technical procedures while programming, compositional ideas sometimes emerge unexpectedly, or are seen with a newfound clarity. For a musician, however, programming also can become a tar pit, consuming far more time than originally anticipated and draining one's creative energies in time and energy not spent on making music.

¶ In 2004, staff member Kevin Ernste consolidated all of the ECMC and open source software used on our Linux systems into a Turnkey Audio distribution. This package, which currently is maintained by Matthew Barber and is used today in conjunction with the comprehensive and well-maintained Planet CCRMA package distributed by the computer music center at Stanford University, enables ECMC users — and anyone else with an internet connection — to download and quickly install an almost exact clone of the music software on our flagship Linux system “madking” onto their own personal computer.<sup>6</sup> At no cost, our students can work at home with the same software they employ in the ECMC Linux studio. And when they leave Eastman, they will still have access to updated versions of this software. We are also pleased to have heard from many musicians with no connection to Eastman who have found our software, documentation, and tutorials useful.

## CHOREOGRAPHING SOUNDS

¶ Alternative approaches to music making in the two studios extends beyond software issues. Multichannel audio (the use of four or more loudspeakers, generally placed near the front and near the room), ambience (creating the illusion of particular types of rooms, spaces, or environments in which music is heard) and spatialization of sound sources (“choreographing” musical sounds, so that they seem to emanate from various perceived locations within the listening environment) have become important resources in electroacoustic music as well as in commercial recording and multimedia presentations.

¶ The most commonly used approach to employing these three related resources is 5.1 surround format, in which sounds are panned between three front and



two rear loudspeakers, and very low frequencies from all channels are routed to a subwoofer.<sup>7</sup> The MIDI studio has been configured for 5.1 playback in order to acquaint students with localization procedures they may encounter professionally, not only in film music production, but also in SACD (Super Audio Compact Disc) and DVD-Audio releases of musical albums.

¶ But 5.1 surround is only one of several approaches to spatializing sounds throughout a room, and to many of us not one of the more effective methods. The Linux studio is equipped with twelve loudspeakers designed primarily for sound spatialization by means of ambisonic processing, a conceptually simple but powerful set of procedures first developed in the United Kingdom. A four-speaker array is used for quadrasonic front-rear spatialization, while an eight-speaker system (with four speakers above ear level and four speakers below ear level) provides full 3-dimensional localization capabilities.

### MOSAIC

¶ We strongly encourage or — for students who follow the full two-year ECMC sequence in computer music techniques — compel students learn how to use a wide variety of commercial and open soft music software and to move freely between our Windows, Macintosh, and Linux computer systems. Only through familiarity with a broad range of hardware and software options and of alternative approaches to employing digital audio resources can one make informed choices.

¶ Over time, most ECMC staff members and student users develop an affinity for one or another computer platform and for particular software applications because they discover that these particular resources tend to stimulate their musical imaginations, or provide an especially productive working environment. Fortuitously, our staff members tend to develop quite different preferences, and as a result different areas of expertise. At the same time, each staff member is conversant with the “big picture” — the full range of ECMC hardware and software resources, and how these resources fit together in our creative and instructional programs.

¶ All of this makes working in the ECMC studios much more interesting and much easier. If we all had the same preferences, we would probably come up with the same solution when a problem arises, and because of our shared (and therefore redundant and limited) perspective this is likely not to be the best solution.

### AN ASIDE: KNOWING TOO MUCH

¶ Fifteen years ago, students generally entered our computer music classes with little or no prior experience working with computers. Many were initially wary or uncomfortable when compelled to sit before a monitor and keyboard, and a period of acclimatization was necessary. Today, most students entering these classes

have abundant experience using computers, some since early childhood. In fact, some students already have assembled personal computer music studios. Ironically, there are occasions in which this very familiarity can actually complicate or hinder a student's mastery of new concepts and techniques. Students who already have assembled their own audio hardware and software, or perhaps have worked in a recording studio, or play in a band that makes heavy use of electronics, have often invested a considerable amount of time, effort, and sometimes money in mastering particular digital audio resources. They may have developed a commitment to these resources and find it hard to let go and take a fresh, unbiased look at alternative approaches to music making with computers.

¶ This situation does not arise often. Most ECMC students, regardless of their prior background (or lack thereof) in computer music techniques are eager to explore digital audio resources in a free and open manner. But some of the students who have gotten the least out of our courses have been those who came in with the "best" preparation. Something was missing, and although they did their assignments and passed the course I was unable to teach them much of significance.

### IMAGEMOVEMENTSOUND

¶ The Rochester ImageMovementSound festival [ [imsrochester.org](http://imsrochester.org) ] began with a hybrid "film exhibition/concert" show that experimental animation filmmaker Stephanie Maxwell of the School of Film and Animation (SOFA) at the Rochester Institute of Technology and I curated and presented before a standing-room-only audience of 500 in Eastman's Kilbourn Hall on March 19, 1997. Showcasing innovative techniques in computer-generated and live acoustic musical production and in experimental animation and live action filmmaking techniques, this show was repeated in September for the visiting artists series at Colgate University.

¶ The following year Stephanie and I made contact with Susannah Newman, graduate co-coordinator of the Department of Dance at the State University of New York, Brockport, and the three of us mapped out a framework for future IMS productions. Now in its eleventh season, the ImageMovementSound festival sponsors the creation of multimedia works collaboratively conceived and realized by groups of two or more artists from Rochester area universities. Over a period of six months of often concentrated work, teams of filmmakers, video artists, composers, performing musicians, choreographers, dancers, painters, graphic and media artists (and sometimes artists from other disciplines) from Rochester area colleges and universities work closely together to create innovative multimedia works for screen and live performance.

¶ Each spring the resulting works are premiered in multiple performances at various venues in and around the Rochester area. These shows are produced by the participating artists themselves, supplemented by technical assistance from ECMC staff for audio playback and sound reinforcement. A hallmark of the festival

since its inception has been a coming together not only of artists of diverse talents, interests and disciplines, but also of similar diverse audiences for cinema, music (concert, jazz and popular), and dance, and of the simply curious — people open to the exploration of thought-provoking alternatives to formulaic commercial media and eager to share in art that is challenging, unexpected, and alive.

¶ Well over a hundred works have been created for presentation on IMS festivals. Many of these works subsequently have been exhibited or produced on international film festivals, concerts and a wide variety of other venues. A good number have gone on to win prestigious awards and have attained widespread recognition, and some have led to ongoing collaborations between artists after they have left Rochester.<sup>8</sup>

### TAKE IT OUTSIDE, FOLKS

¶ IMS festival performances are only one of a growing number of activities supported by the ECMC outside of our studios and, often, outside of the Eastman School of Music. Most of these activities involve concert performances and related functions sponsored by the ECMC, by the Eastman Composition Department, and by the Ossia new music ensemble, but also include faculty and student recitals as well as performances and readings presented by various Eastman ensembles, such as Musica Nova and student groups. At these events — which typically number three or four venues per month throughout the school year — ECMC staff provide services such as recording, amplification and sound reinforcement, audio playback, and live electroacoustic sound generation.

¶ To support these services, the ECMC maintains a collection of audio and computer equipment expressly for remote use that includes two laptop computers loaded with audio and MIDI applications, twenty-one loudspeakers, two mixing consoles, an array of condenser and dynamic microphones and preamplifiers, compact disc and DVD playback decks, and various other audio equipment.

¶ In addition to our desire to support concert presentations within the school and within the community, and the much greater portability and ease of setup of computer and audio equipment today, there are other reasons why an increasing amount of ECMC activities take place outside of our studios.

➤ Twenty years ago computer music concerts primarily featured the playing of tape pieces. Electroacoustic works “for unaccompanied computer” remain an important and fascinating genre. Today, however, a majority of electroacoustic works involve live performance elements, which may include interactions between performers or between performers and “machines;” the processing (alteration) of sounds produced by instrumentalists and singers; performers playing computer-based instruments; film, dance, or other forms of multimedia production; instrumental performances of compositions realized in part or in whole by

computer-assisted compositional techniques; or any number of other interactive computer music resources that have been developed since the founding of the ECMC studios. Such music is not “complete” until it is performed.

➤ We want to get this music out into the world —onto the concert stage, but also in new and sometimes unconventional venues such as libraries and museums, or even (who knows?) shopping malls or muffler repair shops, where the music will find new audiences. Let the birds out of the cage!

➤ We’re just plain out of space in the ECMC studios, and are anticipating an eventual move to expanded quarters as part of the School’s five year strategic plan. At present, some of our creative and instructional activities simply cannot be performed within the overcrowded confines of the ECMC studios, and so must be accomplished somewhere out in the great wide world beyond these confines.

### WHO ARE THESE PEOPLE?

🎧 Unlike some computer music centers, the ECMC staff has always consisted primarily of Eastman graduate students pursuing master’s and doctoral degrees in composition, performance, and other disciplines. These students receive a graduate award stipend for ten to twelve hours of work each week in the ECMC studios and on remote functions. (Should you hear rueful chuckles or groans nearby, these are probably the incredulous responses of some of our current graduate teaching assistants to my 10- to 12-hour weekly timecard estimate. Naturally this figure does not include unpaid overtime.)

🎧 Staff members teach certain topics (and sometimes entire classes) for the two ECMC computer music courses; provide weekly individual lab instruction for these classes as well as technical support to faculty and continuing student users; maintain the hardware, software, system administration, user accounts, security, and networking capabilities of our eleven computer systems; maintain and repair audio hardware; build (and frequently re-build) our Windows and Linux computer systems from component parts; write audio and general purpose programs and utilities for use on our systems; research and provide expertise in particular areas of hardware, software and audio resources; develop new capabilities for the studios, such as our recently installed eight channel playback system; serve as audio and recording engineers and as computer operators on our concert, recording, and other remote operations, and as liaisons with ensembles, faculty, and students in the organization of these remote gigs.

🎧 Obviously the wide range of musical and technical resources and activities detailed on these pages would be unthinkable without the extraordinary capabilities and contributions of these staff members who, although still students, are already highly skilled professionals in many areas of computer technology and

audio production. Nevertheless, technical know-how is by no means their most salient contribution to the ECMC or the Eastman School of Music. Above all else, they are fine musicians and bring to each of their tasks a remarkable musical command and understanding that motivates and informs their work.

¶ Many of our former staff members and students are directors of computer music studios, teaching electroacoustic music techniques, or incorporating their knowledge of these techniques into the teaching of composition, performance, theory, and other areas. Others are applying their knowledge in careers as solo or ensemble performers or freelance musicians; many work in film, multimedia, television, digital or interactive media, or as software developers or audio engineers; some work with dance companies, some are in arts administration. In order to practice their art, musicians today must be versatile, entrepreneurial, and capable advocates for their art and for themselves. And often, there is no way to anticipate the kinds of bounces that a musical career will take.

## MUSIC

¶ Much of this rambling memoir has seemed to focus on things — equipment, facilities, technology, software, and the like. However, when I reflect upon the twenty-five-year history of the ECMC, all of this paraphernalia is rarely what comes to my mind. What I do remember, often with indelible clarity, are particular electroacoustic compositions and multimedia works created by ECMC users, and memorable interactive performances involving computer music techniques that have been presented on concerts sponsored by the ECMC and by various other ensembles and individuals within the School.

¶ I will not recount these many compositions and performances, nor attempt to compile a top ten list, which would be a futile, hare-brained undertaking. Instead, I will state the obvious: far and away the greatest achievement of the ECMC during the past twenty-five years has been the music.

¶ A whole LOT of music has come out of this place. And some of it has been music of substance, of daring, of wit, of surprise, of mystery, or of unanticipated beauty; but also music that may bewilder, challenge, or even rankle the ear or the mind. Music that is not dead.

¶ The ECMC 25th Anniversary Concert Series is intended as a window into the richness of this music: works by internationally celebrated electroacoustic composers, and representative works by composers who learned at least some of their craft in the ECMC studios; performances by outstanding players, including ECMC alumni; and participation in several performances by distinguished researchers and developers in the field who have opened doors to many new compositional and performance resources and thus helped make possible some of the works on this series.

¶ For another window into all this music, visit the ALUMNI page of the ECMC web site [ <http://ecmc.rochester.edu/ecmc/alumni.html> ]. Explore the profiles and links to some of our alumni's home pages, many of which offer mp3s, other types of multimedia, and information on their recent works and activities.

### SOME SPECIAL FRIENDS

¶ Composer Vladimir Ussachevsky, a pioneering figure in the development of electroacoustic music between 1959, when he founded the Columbia-Princeton Electronic Music Center, and his retirement in 1980, was an Eastman alumnus. In the decade after his retirement Vladimir would visit the ECMC studios every so often, and we engaged in lively conversation. He maintained a keen interest in all aspects of electroacoustic music and was always eager to discuss new resources and to hear recent compositions that used those resources, including compositions by ECMC students. During his final decade he also traveled frequently to Russia and Eastern Europe, where he donated computers and audio gear to new music centers and to composers who otherwise had no means of obtaining such equipment.

¶ A year or so after Ussachevsky's death in 1990, I was surprised to learn that he had left a generous bequest to the ECMC studios in his will. Yearly interest from this trust enables us to purchase equipment (such as our eleven Genelec loudspeakers) and to support functions that otherwise would be beyond the resources of our Eastman budgetary allocation.

### §

¶ Collaborative projects between composers and performers have been a hallmark of the ECMC studios for more than twenty years, and some of these projects have involved works commissioned by or written expressly for Eastman faculty performers such as David Burge, Robert Sylvester, John Marcellus, and John Beck. The faculty performer who has been most ambitious and instrumental in initiating such projects is John Graham, Professor of Viola.

¶ Graham has actively sought out both faculty and student composers, attending recitals and forums by undergraduate and graduate composition majors, IMS festivals, and other events that afford him the opportunity to become acquainted with music by our young composers. At Graham's request, six ECMC composers have written works that he has premiered and added to his recital repertoire. These works employ a wide range of electroacoustic resources as well as innovative writing for the instrument, including live computer processing of the viola, interactions between solo and computer parts, extended techniques and improvisation. The compositions are remarkably different in character, structure, and technique (which delights him), and highlight some of the many facets of his virtuosity, consummate musicianship, and unique performing abilities.



¶ Graham has performed these works while touring in China, at Aspen, in Santa Fe and other venues, and his interpretations of a work often vary considerably from one performance to the next. All of these good things have happened without a dime of institutional or foundation support, through the enterprising and persuasive efforts of a musician who cares deeply about the music and art of his time.

## §

¶ I am fortunate to have been granted several sabbaticals over the past two decades to pursue compositional, research, performance, and other projects and, in the process, catch a breath. In my absence, staff members Craig Harris (1987), Patrick Long (1996-7), Greg Wilder (2000), and Kevin Ernste (2004) have stepped in as acting directors of the ECMC to teach my classes and assume administration of daily operations and long term planning for the studios and programs.

¶ During each of these periods, Craig, Pat, Greg, and Kevin not only kept the place humming smoothly, but actually left the studios in better shape, restructuring and adding vital new components to the curricula of the two classes, undertaking new developmental initiatives to enhance the studios, and updating equipment and software to which I had grown overly accustomed or paternally forgiving, but which they found antiquated or inadequate, or for which they found better alternatives. For their conscientious oversight of the ECMC and initiative in bringing fresh perspective and leadership to our programs, I and all faculty and student ECMC users are indebted to these fine musicians, whom I am proud to call my friends.

¶ Sensing a whiff of complacency or entropy creeping into ECMC operations last year, I applied for another sabbatical, which has been granted for a six-month period beginning in January 2007. With flawless timing, I managed to schedule this leave to coincide with one of the busiest periods in the history of the ECMC — our 25th anniversary celebration, which will also be a time of uncommonly rapid staff turnover.

¶ Three of our current staff members, Paul Coleman, Matthew Barber, and Scott Petersen, are assuming responsibility for administration of instructional and creative programs during this period of intense activity and change. They will be assisted by Baljinder Sekhon, Tiffany Ng, Robert Pierzak, and Christopher Winders. All are talented, bright young professionals with remarkable abilities and the potential to make significant contributions to the musical community. And all are my friends. The ECMC studios are in very capable hands. When I return next September it will be with considerable anticipation to see what changes and improvements they have implemented in our programs, and to hear some of the new music that has been created in the ECMC while I was away.

Allan Schindler  
October 2006

## § FOOTNOTES

<sup>1</sup> Wayne, who earned the first doctorate in composition in the US in 1937, remained a good friend of our program until his death in 1995. Although he found our computer systems somewhat mystifying, he would stop by the studios several times per year to chat about the state of digital audio technology and see our new toys.

<sup>2</sup> Like most early digital synthesizers, the Synclavier produced various types of timbres through fairly simple implementations of frequency modulation (FM) techniques first developed by John Chowning.

<sup>3</sup> Bob Morris wrote five other works in the ECMC studios over the next decade. He works primarily in his home studio today, but still makes regular use of the ECMC studios for particular projects.

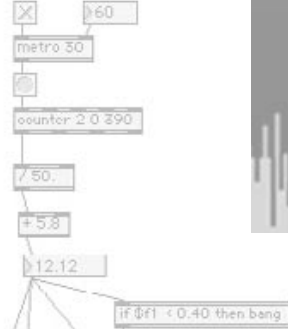
<sup>4</sup> A New York Times review of this conference is online at [ <http://query.nytimes.com/gst/fullpage.html?res=9F02E6DD143BF933A25753C1A965948260> ]

<sup>5</sup> French. “The more things change, the more they stay the same.”

<sup>6</sup> See the DOWNLOADS sector of the ECMC website at [ <http://ecmc.rochester.edu/ecmc/downloads.html> ]

<sup>7</sup> The .1 indicates that the sixth speaker, the “sub,” uses only the lowest 10% of the full audio bandwidth, or frequency range. Sometimes 6.1, 7.1, and 10.1 systems are also employed.

<sup>8</sup> The article “Animated Image, Animated Music” that Stephanie Maxwell and I wrote on collaborative processes in some of our own film/musical compositions, included in The Sharpest Point: Animation at the End of Cinema, conveys more of the philosophy and flavor of IMS: [ <http://ecmc.rochester.edu/allan/writing.htm> ]



# ECMC<sup>25</sup>

eastman computer music center

*Celebrating 25 years  
of computer music  
at Eastman*

1981-2006

From October 2006 through May 2007, the Eastman Computer Music Center (ECMC) of the Eastman School of Music in Rochester, New York celebrates the twenty-fifth anniversary of the founding of its studios and programs with a special series of concerts, multimedia exhibitions, installations, talks by distinguished guest artists, and more events.

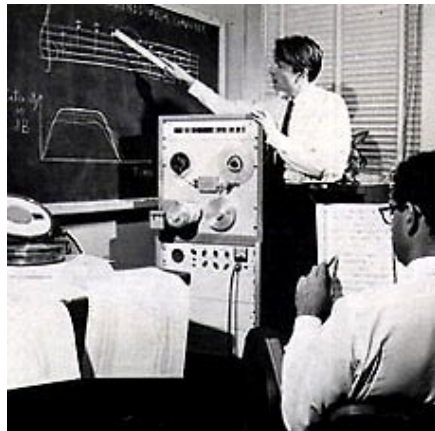
12 october 2006

8 pm § Kilbourn Hall § Eastman School

# inaugural concert featuring guest composers Jean-Claude Risset & Dexter Morrill

guest performer: David Demsey, tenor saxophone

electroacoustic music history  
installation by Scott Petersen



*Revelations* (2005) (1st prize winner, ECMC25 competition)

Juraj Kojs

*Getz Variations* (1984)

Dexter Morrill

1. Echos § 2. Quartet §
3. The Lady from Portola § 4. Windows

*Moments newtoniens* (1977)

Jean-Claude Risset

1. Fluentes et fluxions § 2. Analyse spectrale § 3. Trajectoires

*Resonant Sound Spaces* (*Espaces sonores resonants*) (2002)

Jean-Claude Risset

1. Bell brass metal § 2. Filters § 3. Plectra §
4. Reverberated § 5. Bells, horns

*Voilements* (1987)

Jean-Claude Risset

Celebrated composer and researcher **Jean-Claude Risset** (pictured on facing page) worked with Max Mathews at Bell Laboratories between 1965 and 1969 developing musical resources for sound synthesis. His pioneering work at Bell Labs, still often cited and studied today, included studies in the imitation of instrument tones, in pitch paradoxes, and in the synthesis of new types of timbres, as well as publication of a landmark catalog of computer-synthesized sounds (1969). Risset has founded computer music facilities at Orsay (1970-71) and the University of Marseille-Luminy (1974), and at the request of Pierre Boulez directed the computer music department at the Institut de Recherche et Coordination Acoustique/Musique (IRCAM) in Paris from 1975 and 1979. As composer-in-residence at the MIT Media Laboratory from 1987 and 1989, he implemented the first real-time performance interaction with an acoustic instrument. He is *Directeur de recherche emeritus* at the National Center for Scientific Research in Marseille.

After attending the Lenox School of Jazz, **Dexter Morrill** began graduate studies in composition at Stanford University in 1960, completing these studies at Cornell. He began teaching music at Colgate University in 1969 and in the early 1970s, with help from colleagues at Stanford, established one of the first mainframe computer studios in the world. Morrill was a Guest Researcher at IRCAM in 1980, a Visiting Professor of Music at SUNY Binghamton and Stanford, and has received several composition grants from the New York State Arts Council and the National Endowment for the Arts. In the late 1980's, Morrill developed a MIDI trumpet instrument with engineer Perry Cook, and he has performed on many concerts with cellist Chris Chafe, saxophonist David Demsey, and soprano Pamela Jordan.

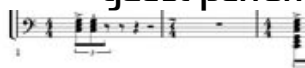
**Juraj Kojs**, born in 1976 and raised in Slovakia, is a Ph.D. candidate in Composition and Music Technologies at the University of Virginia, where he studies composition with Judith Shatin. His works have been performed in Argentina, Chile, Denmark, France, Slovakia, Spain, the Netherlands, and the United States. He is the first prize winner of the International Electroacoustic Music Competition sponsored by the ECMC for its 25th anniversary celebration.

**16 NOVEMBER 2006**

8 pm § Kilbourn Hall § Eastman School

guest composers **Kevin Ernste, Patrick Long,  
& Nicolas Scherzinger**

guest performers: Randall Hall, Jason Price, Jennifer Sacher Wiley, Jennifer Blyth



*Shadowed* (2006)

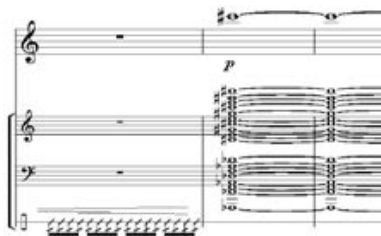
Nicolas Scherzinger



§ Presentation by guest artist *Perry Cook*

*Aries* (1977)

Karlheinz Stockhausen



*Shadow Steps* (2001)

Patrick Long

Excerpts from *Sonata with Words* (2006)

Patrick Long

4. Time Travel
3. Five Years old
7. Timber



8 pm § Kilbourn Hall § Eastman School

24 FEBRUARY 2007

SEACURDAN

guest composer **Paul Koonce**  
 guest artists **Miller Puckette &  
 Patti Monson**  
 joint production with **Ossia New Music**

works in eight-channel digital medium

*Traumerei Machine* (2007) [WORLD PREMIERE]

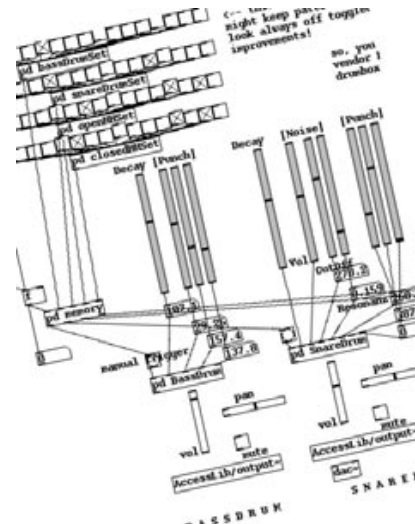
*Anacrusis* (2000)

Paul Koonce

*Jupiter* (1987)

for flute and electronics

Philippe Manoury



[ Concert on 23 February **CANCELLED.** ]

08 march 2007

5:30 - 9:30 pm § Kilbourn Hall § Eastman School

double event :: two audio + video  
multimedia concerts + exhibitions

Curtis Roads &amp; Craig Harris, guest composers &amp; Brian O'Reilly, video artist



[ concert + exhibition 1 | 5:30 - 7 pm ]

THE BEST OF IMS

New and recent works created for the annual  
*ImageMovementSound* multimedia festival.

[ concert + exhibition 2 | 8 - 9:30 pm ]

*Point Line Cloud* (2007)

Curtis Roads &amp; Brian O'Reilly

*Elements* (2006)

John Gibson &amp; Jawshing Arthur Liou

Honorable Mention, 2006 ECMC International Electroacoustic Competition

*Moirures* (2006)

Francis Dhomont &amp; Inés Wickmann

3RD PRIZE, 2006 ECMC International Electroacoustic Competition

*Threshold* (1983) & *Beauty is.../Deep Deep Sleep* (2003)

Craig Harris

7 pm § Gallery Auditorium of the Memorial Art Gallery  
500 University Avenue

22 **march** 2007

CHURCH

ECMC alumni concert featuring guest composers

**JoAnn Kuchera-Morin & Greg Wilder**

guest performers: Nathaniel Bartlett, marimba & Jill Felber, flute

(intermission) installation of works by ECMC alumni

pd GesturesSection1

pd GesturesSection2

pd GesturesSection3

pd GesturesSection4

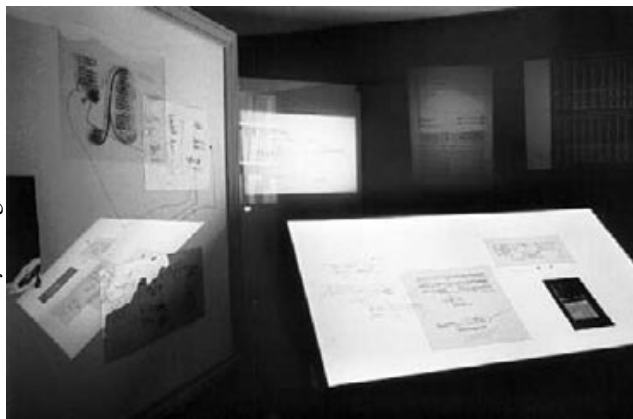
pd GesturesSection5

pd GesturesSection6

pd GesturesSection7

pd GesturesEnd

“Configurable Space 1: Multimedia Installation  
Room View by Craig Harris.” Photo: Marion Gray.



*timeandagain* (2007) for flute & multi-modal music stand

JoAnn Kuchera-Morin

*Synchronisms No. 8* (1974), woodwind quintet & tape

Mario Davidofsky

*Correspondence* (2007), guitar & processed sound

Chris Winders

*Modern Forest* (2007), multimedia sound sculpture

Scott Petersen

...and works by

Allan Schindler

Greg Wilder

HOPMAN

14 APRIL 2007

see website for complete program

5 - 8 pm § Interfaith Chapel § Wilson Blvd., University of Rochester  
6 - 7:15 pm § reception  
with Eastman Organists & guest composers

Steve Everett, Ron Nagorcka, René Uijlenhoet

*Vanitas* (2005) for organ & Kyma

Steve Everett

*Forging* (2003)

Stephen Ingham

*God of the Expanding Universe* (1971)

Richard Felciano

*Dialogo Sopra I due Sistemi* (2003) for organ & live electronics

René Uijlenhoet

*Zware Metalen* (1991) for carillon & amplified electronics

world premiere of a new work for carillon &amp; electronics

Paul Coleman



HOPMAN

02 MAY 2007

noon § Eastman Quadrangle § Univ. of Rochester River Campus

with the UR College Music Department  
Tiffany Ng at the Hopeman Memorial Carillon*Six Treatments for Carillon* (2002)

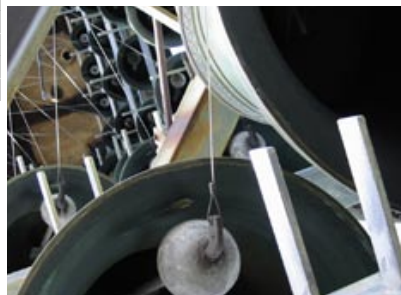
Steven Rush (ESM '85)

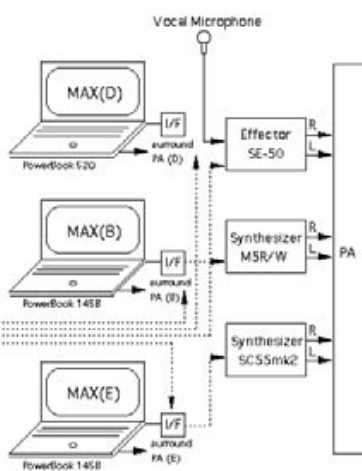
First Treatment § Tilted Waltz § Cloud Bowls §

River Teeth § Homage to Ives § Bolts

New work for carillon and electronics TBA

David Wessel





# ECMC Alumni

ARE LEADERS IN THE CREATION,  
PERFORMANCE, AND TEACHING OF  
NEW MUSIC ACROSS THE COUNTRY.  
THE FOLLOWING PROFILES GIVE A  
CROSS-SECTION OF THEIR WIDE-  
RANGING CONTRIBUTIONS.

**KATHRYN ALEXANDER**, Associate Professor of Music, is jointly appointed to Yale University's Department of Music and School of Music, where she teaches acoustic composition and music and video technology. She is Director of the Department's YalMusT Lab and Associate Director of the School's Center for the Study of Music and Technology. [ [www.yale.edu/yalemus/faculty/alexander.htm](http://www.yale.edu/yalemus/faculty/alexander.htm) ]

**CHRISTOPHER BAILEY** is Visiting Assistant Professor of Music at the College of William and Mary in Virginia. A new CD with two large works, "Balladei" for piano and recorded electronics and "Sonata" for solo piano, will soon be released. [ <http://music.columbia.edu/~chris/> ]

**PAUL BARSOM** teaches composition and electronic music at The Pennsylvania State University. His compositional output includes orchestral, choral, and chamber music published by Ringing Change Music and Lyceum Press. [ [http://www.music.psu.edu/Faculty%20Pages/barsom/my%20pages/Paul\\_Barsom\\_Homepage.html](http://www.music.psu.edu/Faculty%20Pages/barsom/my%20pages/Paul_Barsom_Homepage.html) ]

**NATHANIEL BARTLETT** [ECMC artist] is dedicated to the music of our time, commissioning, performing, and recording works for the modern marimba. In particular, he is interested in works that utilize 3D computer-generated sound projection. In 2006, his debut solo album was released on Albany Records. [ [nathanielbartlett.com](http://nathanielbartlett.com) ]

**MARCIA BAUMAN** (Ph.D. '95) was a Research Associate at Stanford University's Center for Computer Research in Music and Acoustics (CCRMA) from 1990 to 1996. Her project, creating the International Digital ElectroAcoustic Music Archive (IDEAMA), involved the collection and preservation of historically significant electro-acoustic music. She is currently an Expressive Arts Educator and Consultant. [ <http://astro.temple.edu/~aleck/> ]

**ALECK BRINKMAN** (Ph.D. '78) is Associate Professor of Music Theory at Temple University and has performed extensively as a jazz bassist.

**CALEB BURHANS** works in New York as a freelance musician doing everything from playing with rock bands, orchestras, and new music ensembles to singing with church choirs. Much of his compositional effort is going into his duo with Grey McMurray, "it's not you, it's me." He is a member of the contemporary music ensemble Alarm Will Sound. [ [calebburhans.com](http://calebburhans.com) ]

**GAVIN CHUCK** teaches music theory at the University of Michigan School of Music, Theatre, and Dance. He is active in new music as a composer and a director of Alarm Will Sound. [ [alarmwillsound.com](http://alarmwillsound.com) ]

**JAMES CROSON** worked and studied in the ECMC from 1995-1999, but is now considered legacy technology. Though slow by today's standards, many treasure the rich and expressive quality of his sounds. He lives, works, and composes in Mount Dora, Florida.

**MANUEL DEMURGA** is Associate Professor of Music at Stetson University. His compositions have received international performances at concerts and music festivals in the United States, Europe, and Australia. His compositions can be heard on the GM Recordings label. [ [www.stetson.edu/music/faculty/demurga.php](http://www.stetson.edu/music/faculty/demurga.php) ]

**DENNIS DESANTIS** lives in Berlin, where he maintains an active international performance and production schedule and works as a sound designer for Native Instruments. His debut album "Clock Wise" was released on k2o in 2002, becoming one of the label's top-selling albums. [ [dennisdesantis.com](http://dennisdesantis.com) ]

**KEVIN ERNSTE** [ECMC25 artist] served as Acting Director and lecturer at the ECMC for the fall semester of 2004 and was co-director of the ImageMovementSound festival 2004. He is now Assistant Professor of Music Composition and director of the Cornell Electroacoustic Music Center. [ <http://digital.music.cornell.edu/kevinernste/> ]

**JASON FEDERMEYER** (M.A. in Composition, 2003) is enrolled in the DMA program in Composition at Stanford University under the tutelage of Mark Applebaum, Brian Fermeyhough, and Eric Ulmann. His dissertation will examine various compositional implications found in the writings of Henri Bergson (duration/simultaneity/multiplicity), Gilles Deleuze (formal folds via Leibniz), Martin Heidegger (standing reserve), Simone de Beauvoir (transcendence/immanence), and Friedrich Nietzsche (eternal return).

JON FORSHEE lives in Paris where he is active as a composer and as a performer, collaborating with musicians, poets, visual artists, and music educators. Jon also writes texts on music aesthetics and music technology, and his work has appeared in The Computer Music Journal, The Open Space Magazine, Paris-Link Magazine, and Perspectives of New Music. [ [jonforshee.com](http://jonforshee.com) ]

STEFAN FREUND is active as a performer and producer of new music, particularly as cellist and production board member of the new music ensemble Alarm Will Sound. He is Assistant Professor of Composition and Music Theory at the University of Missouri, and his music has been performed at such venues as Carnegie Hall, Lincoln Center, the Kennedy Center, Weill Recital Hall, Tivoli Theater (Denmark), Queen's Hall (Denmark), and the National Gallery of Art. [ <http://music.missouri.edu/faculty/freund.html> ]

BEN HACKBARTH is pursuing his Ph.D. in composition at the University of California, San Deigo, where he has studied with Chaya Czernowin and Philippe Manoury and currently works with Roger Reynolds. He is a graduate researcher at the Center for Research and Computing in the Arts (CRCA), where he works with Miller Puckette and is writing an event note-list generator for csound/pd. His current compositional interests reside in the electro-acoustic realm where he focuses on dialogue, illusion, and interactivity between western instruments and electronic sound. [ <http://crca.ucsd.edu/~ben/> ]

PETER HAMLIN is Associate Professor of Music and Music Department Chair at Middlebury College. His music includes works for orchestra, band, choir, chamber ensembles, and electronic media, and he has a number of pieces published and recorded. He contributes articles to Electronic Musician magazine. His work for live electronic music includes an opera based on Poe's The Masque of the Red Death. [ <http://datastream2006.tripod.com/id15.html> ]

CRAIG HARRIS [ECMC25 artist] serves as Executive Director for the Minneapolis-based dance theatre company BALLET of the DOLLS. His book Art and Innovation, documenting collaboration between artists and research scientists at Xerox Palo Alto Research Center (PARC), was released in 1999 by MIT Press. His electroacoustic work, "The Hill Has Something to Say," commissioned by soprano Renée Fleming, was premiered in Alice Tully Hall at the Lincoln Center in 2000. [ [kolmon.com](http://kolmon.com) ]



**MIKE HAY** is in Los Angeles working as a composer, having recently completed an internship in film composition sponsored by the Society of Composers and Lyricists.  
[ [mikehay.com](http://mikehay.com) ]

**DAVID HEUSER** is Associate Professor of Music at the University of Texas at San Antonio, where he teaches composition, theory, and electronic music and runs the electronic music studio. He written lots of music for both acoustic forces of all kinds as well as the occasional electronic work.  
[ <http://music.utsa.edu/electron/heuser.htm> ]

**CHRIS GENNAULA** lives in Minneapolis, MN where he has worked as a software developer for Cray Research, SGI, and currently Cassatt Corporaton. His works have been performed at the Sonic Circuits Festival, The Fringe Festival, Nautilus Musical Theater, and the Basilica of St. Mary. [ [gennaula.com](http://gennaula.com) ]

**KOZUE JINNOUCHI** lives in Tokyo, where she is working as a DJ and producer for internet radio in Aoyama, composing for a New York off-broadway show, and tutoring Japanese children in English. [ [kozuejinnouchi.net](http://kozuejinnouchi.net) ]

**JONATHON KIRK** lives and performs in Chicago and is an adjunct lecturer in music theory at Northwestern University, where he is completing his doctorate in composition. He teaches electronic and computer music at Brown University during the summer months. [ [quadrahex.com](http://quadrahex.com) ]

**MARK KIRSCHENMANN** resides in Ann Arbor, Michigan where he is Adjunct Assistant Professor at the University of Michigan. Mark variously teaches courses in jazz theory, creative improvisation, jazz combos, composition, and directs the Michigan Youth Jazz Improvisation program at the UM. Mark is an active freelancer (acoustic/electric trumpet) and his diverse compositions are performed around the world. He is married to Finnish cellist Katri Ervamaa and they are the parents of currently only child Julia, who apparently has a sibling on the way. [ [sonikman.com](http://sonikman.com) ]

**JOANN KUCHERA-MORIN** [ECMC25 artist] is professor of composition, director of the Center for Research in Electronic Art Technology, and chair for the Media Arts and Technology Program at the University of California, Santa Barbara. She is a co-founder of the UCSB-MAT-CNSI Collaboratorium, which partners California digital media industries with University of California faculty and student researchers in fields furthering digital media core technology development. [ [http://collaboratorium.mat.ucsb.edu/events/Bios/joann\\_kuchera-morin.html](http://collaboratorium.mat.ucsb.edu/events/Bios/joann_kuchera-morin.html) ]

**MIKEL KUEHN** is Associate Professor of Composition at Bowling Green State University. His music has received awards and recognition from ASCAP and BMI, the Chicago Symphony Orchestra, the Eastman School of Music, the League of Composers/ISCM, the University of Illinois Salvatore Martirano Memorial Composition Contest, and the Luigi Russolo Competition (Italy). His music has twice represented the US abroad (for ISCM and SEAMUS) in both the acoustic and electroacoustic mediums, and has been programmed throughout the US, Australia, Canada, and Europe. [ <http://mustec.bgsu.edu/~mkuehn/> ]

**NEIL LARSON** ('01) is an audio engineer and freelancer in the Boston / New York City area. He has composed music and designed sound for a variety of technology, media, and entertainment companies. In addition, he is a member of the live electronic dance music quartet Psylab, which recently performed alongside Thievery Corporation, Brazilian Girls, and the Roots. [ [drnigel.net](http://drnigel.net) ]

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**SHAHER MAHONEY** is Professor of Music at Hunter College. His music has been performed at venues around the world including Carnegie Hall, Lincoln Center, Merkin Hall, and Miller Theatre; it has won numerous awards, including two from BMI, a Morton Gould Award from ASCAP, and the Bearns Prize from Columbia University. Last year, Absolute Ensemble's recording of his music was nominated for a Grammy Award in the category "Best Small Ensemble Performance." [ [www.hunter.cuny.edu/music/facultybios/mahoney.shtml](http://www.hunter.cuny.edu/music/facultybios/mahoney.shtml) ]

MATTHEW MCGAUGHEY works as a film composer in Hollywood. He uses music technology in a multitude of different ways. Employing interactive software such as MAX/Msp, Live, and Vienna Symphonic Instruments, he pushes the scope of musical expression to the limits of the genre. [ [serialmusique.com](http://serialmusique.com) ]

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IAN QUINN is professor of Music Theory and Composition at Yale University, specializing in music cognition and the foundations of music-theoretic practice. In 2007-8 he will be a Residential Fellow of the Center for Advanced Study in the Behavioral Sciences at Stanford University. [ [www.yale.edu/yalemus/faculty/quinn.htm](http://www.yale.edu/yalemus/faculty/quinn.htm) ]

PAUL RELLER is Associate Professor at the University of Southern Florida, where he is composition department coordinator and director of SYCOM electronic music studios. He has worked extensively in theater and dance, and his honors include one BMI and two ASCAP awards. [ <http://music.arts.usf.edu/faculty/reller.htm> ]

ADAM ROBERTS is pursuing graduate studies in composition at Harvard University, having studied there with Bernard Rands, Sir Harrison Birtwistle, Chaya Czernowin, Magnus Lindberg, and Julian Anderson. He is director of the Harvard Group for New Music and teaches composition at Northeastern University.

STEPHEN RUSH (DMA '85) [ECMC artist] is director and founder of the University of Michigan Digital Music Ensemble, in its fifteenth year, which has premiered works by LaMonte Young, Philip Glass and "Blue" Gene Tyranny. He has written many works for electronic and acoustic forces, including his techno opera vidGod, performed recently in the US and Europe. [ [www.music.umich.edu/faculty\\_staff/rush.stephen.lasso](http://www.music.umich.edu/faculty_staff/rush.stephen.lasso) ]

NICOLAS SCHERZINGER [ECMC25 artist] is chair of the Composition and Theory Department at the Setnor School of Music at Syracuse University. During the summer, he is composer-in-residence at the Kinhaven Music School. He is active as a performer of improvisatory works for saxophone and computer. [ [scherzmusic.com](http://scherzmusic.com) ]

CHRISTOPHER THEOFANIDIS has had works performed by leading orchestras from around the world, including the National Symphony and the London Symphony. He is serving as Composer of the Year for the Pittsburgh Symphony and teaches at the Peabody Conservatory and the Juilliard School. [ [theofanidis.com](http://theofanidis.com) ]

GREG WILDER [ECMC25 artist] is president of Steeprock Media, Inc., an audio production company pioneering solutions in broadcast recording and interactive media. Steeprock has designed intelligent interactive media systems such as Orpheus that provide tailored musical compositions in real time. Wilder teaches at Dickinson College and West Chester University, where he received an HSA "Outstanding Faculty Member" award. [ [gregwilder.com](http://gregwilder.com) ]

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HOWARD YERMISH earned a Master of Music degree from the USC Thornton School of Music (1996). Recently, he was commissioned by the Choral Arts Society of Philadelphia to write a work for chorus, orchestra, and boys choir for their twentieth anniversary concert. [ [howardyermish.com](http://howardyermish.com) ]



### ECMC :: Staff

(from left to right) Christopher Winders, Matthew Barber, Allan Schindler, Scott Petersen, Paul Coleman, Tiffany Ng, Baljinder Sekhon, Robert Pierzak, Hendel Almetus (not pictured)

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