

## Documentation of Teaching and Mentorship

Attached below are several recent course syllabi, covering courses for undergraduates (Music 1421: *Introduction to Computer Music*; Music 2421: *Computers in Music Performance*) and graduates (Music 6421: *Electroacoustic Composition*).

All Cornell Electroacoustic Music Center (CEMC) classroom activities, syllabi and semester schedules, documentation, studio access/scheduling, and student community interaction are hosted and conveyed via the Center website (<http://digital.music.cornell.edu>), which I built and now administer. In addition to its static content (course information, etc), the site is used to convey weekly lecture and lab materials and follow-ups, answer student questions, facilitate discussions, share finished work and work in progress, introduce upcoming invited guests, make performance announcements, and document past and ongoing Center-hosted research.

[Select examples of CEMC-hosted research](#) (graduate and undergraduate)

These select examples illustrate the Center's flourishing atmosphere of innovation, creativity, and artfulness across students with a variety of musical interests and technological backgrounds. I teach and facilitate creativity with technology generally, with music and sound as the ideal mediator.

### List of courses taught at CEMC

- *Introduction to Computer Music* (Music 1421), Cornell University, 2005–present
  - ⇒ An introductory, project-based course for undergraduates; fundamentals of computer music tools and concepts
- *Computers in Music Performance* (Music 2421), Cornell University, 2006–present
  - ⇒ Strategies and techniques for live electronic and computer music, from DJ to interactive
- *Scoring the Moving Image* (Music 3421), Cornell University, 2008–present
  - ⇒ Conceptual and practical course in multimedia: fixed media, music for the stage, sound art, and the web
- *Electroacoustic Techniques* (Music 6420, graduate seminar), Cornell University, 2005–present
  - ⇒ An introductory course for graduate students in the history, repertoire, and techniques of electroacoustic music
- *Electroacoustic Composition* (Music 6421, graduate seminar), Cornell University, 2005–present
  - ⇒ A composing, analysis, and performance course in composition with computers and related technologies

*Also, those courses taught through my role in Composition (and Music Theory) generally:*

- Composition, Private Lessons, Cornell University, 2005–present
- Composer's Forum (graduate seminar), Cornell University, 2008–present
- Tonal Theory II (Music 2302) and Musicianship II (Music 2403), Cornell University, spring 2012
  - ⇒ Second-year undergraduate music theory (harmony, analysis) and musicianship (sight-singing, dictation)
- Instrumentation for Young Composers (independent course for undergraduates), 2010
  - ⇒ An applied course in instrumentation and orchestration for undergraduate composers

In addition, I frequently offer *Independent Study* and *Honors/Thesis Research* to students whose work and interests extend beyond my courses or who have exhausted my offerings. I am also an advisor to several student groups and campus organizations dedicated to electronic and music and composition generally. This work is *extensive* (~2-4 per semester), an accounting of which [can be viewed online here](#).

## Directorship Activities

Classroom teaching at *CEMC* is underpinned by a state of the art computer music center that I, as *CEMC* Director, designed, built, and continuously support and maintain/update. This includes a primary multichannel studio used by faculty and graduate students, three “project” studios used primarily by undergraduates in Music 1421, 2421, or 3421 (*Scoring the Moving Image*), and a 14-station teaching lab in the Cox Music Library used for group lab sessions. Additionally, I have several concert performance systems (stereo, multi-channel, installation array) and a number of remote recording systems from “laptop, audio interface, microphones” to handheld field recorders.

Beyond the scholarly and the technical, I view my Directorship role as *curatorial*, seeking and inviting interesting guest artists, composers and performers, hosting and supporting workshops at and beyond Cornell (such as the recent [synthesizer building workshop](#) at the *History Center of Tompkins County*), and performing concerts myself, both through my ensemble, CAGE (Cornell Avant Garde Ensemble) and a part of the growing recent trend at Cornell toward presenting music with technology.

Some selected recent guests of the Center include (in reverse chronological order): Tristan Perich, Rand Steiger, [Andrew McPherson](#) (*Magnetic Resonator Piano*), [Ellen Fullman](#) (*Long String Instrument*), Pauline Oliveros, Fred Frith, [Judy Dunaway](#), [Vic Rawlings](#), Frances-Marie Uitti, Ingram Marshall, [Aki Onda](#), Dexter Morrill, and Jean-Claude Risset, to name a few.

## Scholarly Engagement

While I am not actively publishing journal articles in computer music, I am active and admired within the computer music intellectual community at large, attending conferences (usually by invitation), acting as a peer reviewer for *Computer Music Journal*, serving as an international outside reviewer for dissertations in computer music (most recently, the University of Melbourne, Australia), and providing software/hardware solutions for complex performances including my recent implementation, mentioned in my cover letter, of a networked signaling system for the Lucerne Festival Academy’s [September 2013 performance](#) of Horațiu Rădulescu's *4th String Quartet* with the JACK Quartet and eight other quartets.

*Recently invited conferences in computer music:*

- *ICMC 2014, Athens Greece* -- performance of *Palimpsest* for string quartet and electronics
- *Sweet Thunder Festival* (Rand Steiger and Steven Schick) -- *Palimpsest* for string quartet and electronics
- *EMM (Electronic Music Midwest) 2014* -- performance of *Nisi* for horn and electronics
- *ICMC 2013, Perth, Australia* -- performance of *Nisi* for horn and electronics
- *Linux Audio Conference, 2012* -- discussing *Turnkey Linux*, presenting *Birches* for viola and electronics
- *ICMC 2011, Huddersfield, UK* -- performance of *Birches* for viola and electronics

My original audio software bundle, [Turnkey Linux Audio](#), whose popularity brought down the University of Rochester servers [when I first posted it in 2002](#), is now deprecated and hosted online only for historical purposes. Its core materials were ported from Linux to Apple/OSX upon my arrival at Cornell. They are updated periodically, but much of the software contained has been outmoded.

## Music 1421: Introduction to Computer Music

Fall 2014

### Instructor:

Kevin Ernste, Associate Professor  
Email: kevinernste@cornell.edu  
Office: B27 and 337 Lincoln Hall

### Teaching Assistants:

Loren Loiacano, lel87@cornell.edu  
David Friend, dbf66@cornell.edu

Course website: <http://digital.music.cornell.edu>

- please visit the website and register a username

**Music 1421** is an exploration of classical and state-of-the-art techniques for making music with computers. As such, a substantial portion of our time will be spent working with software directly, although “learning software” is not our explicit goal. Our primary focus will be making and understanding music, facilitated by Tuesday lecture/discussions and Thursday practicums.

In developing techniques for recording, manipulating, and mixing sounds, we will be working with several software metaphors: the sound file editor, the digital audio workstation (DAW), the synthesizer, the sequencer, the audio patchbay/mixer and the graphical programming environment, among others, developing a personalized creative toolkit. In addition to commercially available software, students will be introduced to a number of excellent free software tools, many with unique designs and functionality.

Course requirements include three composition projects, one for each of the three parts of the course (see the semester schedule). The last of these will be presented at the *Sound Art Forum* concert at the semester’s end. In addition, weekly or bi-weekly assignments to be carried out on the student’s own time. Studios are available for this purpose and students may sign up for individual time slots (no more than 2 hours per day and 6 hours per week). Visit the course website and follow the “Studios” link to sign up online.

Grading for the semester is broken down as follows:

- 10% Attendance and class participation
- 30% Weekly/bi-weekly assignments
- 30% Two mid-semester projects (15% each)
- 30% Final project and performance (see semester schedule)

All work must be turned in *on time*. Late work will be given one letter grade lower; beyond one week it will *not be accepted*. The final performance is mandatory and non-participation will result in automatic failure (participation and final project grade percentages lost).

**Facilities:** Studios B25B, B25C, and B25D in Lincoln Hall will be our primary studios with additional “overflow” workstations in the Cox Music Library teaching lab. You are highly encouraged, of course, to use your own home or mobile systems where appropriate and available.

## Semester Schedule

### PART I: Digital Audio

Week 1 – August 26th and 28th

- Course Introduction, Audio Recording Techniques

Week 2 – September 2nd and 4th

- Digital Audio Fundamentals

Week 3 – September 9th and 11th

- Audio Editing, Sample Preparation, Sound file Libraries and Mixing Basics

Week 4 – September 16th and 18th

- Principles of Multi-track Mixing and Mastering

Week 5 – September 23rd and 25th

- Signal Routing and Processing

Week 6 – September 30th and October 2nd

- Advanced DAW Techniques, Formats and Finalizing

### PART II: Synthesizers, Samplers, and Sequencing

Week 7 – October 7th and 9th

- Introduction to MIDI

– Project 1 due Thursday October 9th; project listening/discussion

Week 8 – FALL BREAK and October 16th

- Synthesis and Timbre modeling

Week 9 – October 21st and 23rd

- Synthesizers, Sequencing, and Sampling; Non-linear sequencing

Week 10 – October 28th and 30th

- Inter-application Connectivity; Advanced MIDI and Networks

Week 11 – November 4th and 6th

- DIY, Modularity

### PART III: Composition and Live Performance

Week 12 – November 11th and 13th

- Compositional practices and musical form

– Project 2 due Thursday November 13th: project listening/discussion

Week 13 – November 18th and 20th

- Live Performance Techniques and Controllers; Real-time Processing

Week 14 – November 25th and THANKSGIVING BREAK

- Modular Programming and Interactivity

Week 15 – December 2nd and 4th

- Formats, Distribution, Production, and Musical Propriety in the Digital Age

**Final Concert:** Sound Art Forum, Sunday December 7th, 3pm, Lincoln Hall B20

## Music 2421: Performing with Computers

Spring 2014

### Instructor:

Kevin Ernste, Associate Professor

Email: kevinernste@cornell.edu

Office: 337 and B27 Lincoln Hall

Course website: <http://digital.music.cornell.edu>

- please visit the website and register a username

**Music 2421** is an exploration of strategies and techniques for live performance with computers. In developing our awareness of tools for live music we will explore several stylistic and technical approaches to performance: DJ, interactivity, multimedia, installation, and several others. We will engage with an array of software and hardware combinations with a focus on their creative uses, often looking beyond their intended usage to our own, re-imagined purposes.

In addition to commercially available software, students will be introduced to a number of excellent free software tools, many with unique designs and functionality. All tools are available for download on the website (see "free tools"). I encourage students to use this course to begin imagining an individualized performance toolkit and free software is a great place to start.

Course requirements include three short composition projects, one for each of the three parts of the semester (see the semester schedule below). The first two projects will be presented and critiqued in class and the final will be presented at the *Sound Art Forum* concert at the semester's end. In addition, there will be weekly or bi-weekly assignments to be carried out on the student's own time. Studios are available for this purpose. Students may sign up for individual times online. Visit the course website and follow the link to "studios".

**Grading** for the semester is broken down as follows:

10% Class participation (make yourself heard in class and online)

30% Weekly/bi-weekly assignments

30% Two mid-semester projects (15% each)

30% Final project and performance

All work must be turned in *on time*. Late work will be graded **one letter grade lower** and work turned in more than one full week late **will not be accepted**. Class performance dates are mandatory and non-participation will result in automatic failure for that project.

**Facilities:** The *Cornell Electroacoustic Music Center's* studios B25B, C, and D will be our primary studios with more stations available in the Cox music library lab located on the 2nd floor of Lincoln Hall.

All assignments and project are to be handed in on the CEMC network drive, an online storage area where you can also backup or relay data from one studio or lab to another.

## Semester Schedule

### **PART I:** Sound and Live Performance Fundamentals

- < Week 1 – January 21st and 23rd
  - Course introduction and logistics; website information; examples of previous student work
- < Week 2 – January 28th and 30th
  - Digital audio fundamentals, review
- < Week 3 – February 4th and 6th
  - Microphone types and placement, studio and remote recording
- < Week 4 – February 11th and 13th
  - Hardware and software configurations, signal path; MIDI and messaging
- < Week 5 – February 18th and 20th
  - Live audio: signal path and processing, live sound reinforcement

### **PART II:** Connectivity and Interactivity

- < Week 6 – February 25th and 27th
  - Performances and critiques I
- < Week 7 – March 4th and 6th
  - Introduction to graphical programming with PureData (PD)
- < Week 8 – March 11th and 13th
  - PD continued: control data, audio signals; designing user interfaces
- < Week 9 – ***SPRING BREAK***
- < Week 10 – March 25th and 27th
  - PD and JACK (interapplication audio), MIDI, networks and OSC (Open Sound Control)
- < Week 11– April 1st and 3rd
  - Collaborative/cooperative creative work

### **PART III:** At the interface

- < Week 12 – April 8th and 10th
  - Performances and critiques II
- < Week 13 – April 15th and 17th
  - Multimedia; sound art, installations, and the web
- < Week 14 – April 22nd and 24th
  - New and experimental interfaces for performance; DIY technologies
- < Week 15 – April 29th and May 1st
  - Final Concert showcasing and planning: pieces, logistics, publicity

**Final Concert:** Sound Art Forum, Date, time, and place TBA

## Music 6421: Electroacoustic Composition

### Instructor:

Kevin Ernste, Associate Professor  
Office: B27 & 337 Lincoln Hall  
Contact: kevinernste@cornell.edu

Course website: <http://digital.music.cornell.edu>

- please visit the website and register a username if you have not

**Music 6421** is a seminar on the composition of live electroacoustic and computer generated music. The central thread of the course follows the writing of three short study pieces: the first for a soloist, the second for a small ensemble of improvisors (usually of 4 - 10 players), and the last for orchestra, wind ensemble, or chorus. All three pieces will be written, read, and discussed in class and individually. Beyond the weekly seminar meeting time (2hrs per week), individual sessions are offered (1hr per week).

Along the way we will examine and discuss works from the electroacoustic music "canon" as well as pieces of student interest, looking at them critically and analytically, teasing out the ideas and techniques that went into their design and performance. In certain cases, we will construct our own implementations of these pieces using both the original means and course software and hardware.

Grading for the semester is as follows:

- 10% Assignments and participation
- 10% End of semester listening examination (see list below)
- 20% Public Lecture (see below for details)
- 60% Three semester study pieces (20% each)

Class attendance is *mandatory* and class participation is absolutely essential.

**Facilities:** Studio A (B27) will be our primary studio with overflow workstations in B25B->D (mostly used by undergraduates). In addition, there is a developing mobile rig usable for performances and remote recording. Visit the course website and follow the link to "studio signup".

### Public Lecture Guidelines

The public lecture component for *Music 6421* requires students to plan, advertise, and deliver a public lecture on a topic related to the course or to the broader world of electroacoustic music. This might be a composer or piece, technique(s), software or software concepts, a historical topic, or something philosophical or aesthetic. Space will be set aside for presentation during the last two weeks of class but any time can be selected depending on the topic or its relevance to concurrent activities, course-related or otherwise (your topic may, for example, coincide with a performance or demonstration outside of class). You are encouraged to consult directly with Professor Ernste to discuss potential topics of interest.

All assignments and project are to be handed in on the CEMC network drive, an online storage area where you can also backup or relay data from one studio/system to another.

## Listening List

Recordings are available in the COX Music Library or in the "sflib->listening" directory on CEMC systems where not indicated below.

Antheil – Ballet mécanique (CD 10130) and video on <http://www.antheil.org>  
Ashley - The Wolfman  
Ashley - Automatic Writing  
Babbitt – Philomel (CD 5102)  
Berio – A-ronne ( Rec 1586 B502 A7)  
Berio – Thema (Omaggio a Joyce)  
Berio – Visage (Rec 175 E4 E31)  
Boulez – Répons --M1045.B76 R4 2001 Folio (CD 8509)  
Cage – Imaginary landscape no. 1 (CD 4355)  
Cage – William's mix (CD3670)  
Cage – Cartridge Music  
Cage/Hiller – HPSCHD (Rec 175 E4 C13 H2)  
Carlos – Beethoven's 9th Symphony, Mvt. 4 (resynthesis)  
Carlos – Timesteps  
Chowning - Sabelithe  
Chowning - Stria  
Chowning - Turenas  
Chowning - Phone  
Collins - Broken Light I  
Davidovsky – Synchronisms #6 (CD 1312)  
Dodge – Any Resemblance Is Purely Coincidental (CD 2605)  
Dodge – Earth's magnetic field (CD 6713)  
Dodge - Speech Songs  
Eno – Music for Airports (Rec 3 .1 E6)  
Harvey – Mortuos plango, vivos voco (Rec 5 I65)  
Harvey – Bhakti -- M947.H34 B5 1989 (CD 12107)  
Harvey - String Quartet #4  
Henri/Schaeffer – Symphonie Pour Un Homme Seul (Symphony for a Man Alone) -- CD 2588  
Henri - Viole d'Orphee  
Hiller -Illiatic Suite  
Hiller - Computer music for percussion and tape (1968)  
Kagel – Transicion I (Rec 175 E4 E31)  
Lansky – Idle Chatter, Just-more-idle-chatter, Notjustmoreidlechatter (CD 7313)  
Lansky – Six Fantasies on a Poem by Thomas Campion (CD 3691)  
Ligeti – Artikulation (CD5601) -- M1473.L72 A8 1994  
Lockwood - World Rhythms  
Lucier – Music on a Long Thin Wire -- Rec 1473 L93 M8  
Lucier – I am sitting in a room (CD 5317)  
Lucier - Nothing is Real  
Lucier - Music for piano with amplified sonorous vessels (1990) (!!!)  
Lucier - Music for Solo Performer (1968)  
Lucier - Crossings (1984)



Marshall – Fog Tropes  
Matthews, Max – Bicycle Built for Two. (CD 8717)  
Mel Powell – Strand settings: darker (CD 9615 v.8)  
Neuhaus - Times Square  
Neuhaus - Listen (PDF)  
Niblock - Winterbloom  
Niblock - Harm  
Oliveros – Sound Patterns  
Oliveros - Mnemonics III  
Oliveros - I of IV  
Reich – Come out (CD 1613)  
Reich – Pendulum music (CD 9026)  
Reich - Different Trains  
Reich - Violin Phase  
Reich - Electric Counterpoint  
Risset – 'L'Autre Face (CD 5101)  
Risset – Sud (CD 6649)  
Risset – Songes (CD 14870)  
Saariaho – NoaNoa (CD 9010, CD 9035)  
Saariaho – Près (CD 9035)  
Schaeffer – Études aux chemins de fer  
Schaeffer - Solfège de l'objet sonore  
Speigel - Appalachian Grove  
Subotnick – Silver Apples on the Moon (Rec 175 E4 S94 S5)  
Subotnick – The last dream of the beast ( Rec 1497 L112)  
Subotnick – Wild Bull  
Stockhausen – Hymnen (Rec 1473 S86 H9)  
Stockhausen – Kontakte with piano and perc -- M342.S86 K8 Folio (Rec 1473 S86 K8)  
Stockhausen – Gesang der Jünglinge (multichannel version in sflib)  
Stockhausen – Mantra (CD 5856)  
Stockhausen - Mikrophonie I (1964)  
Stockhausen - Mikrophonie II (1965)  
Stockhausen - Stimmung (1968)  
Takemitsu - Vocalism Ai  
Tudor - Rainforest IV  
Tudor -Phonemes (1981)  
Varèse – Déserts (CD 7232)  
Varèse – Poème Électronique (CD 7232)  
Wishart – Vox, no. 5 (CD 8717)  
Vitiello - Winds After Hurricane Floyd  
Wourinen – Time's Encomium (CD 5693)  
Xenakis – Concrete PH (Rec 1473 X51 E3)  
Xenakis – Mycenae Alpha -- UPIC score online (CD 5102)  
Xenakis - Bohor  
Xenakis - La Légende D'Eerz