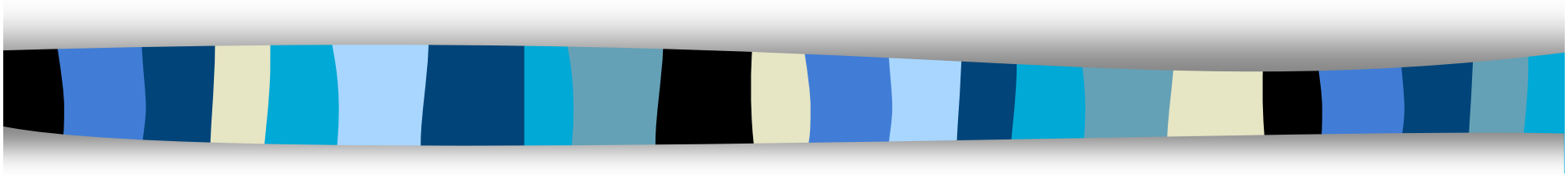
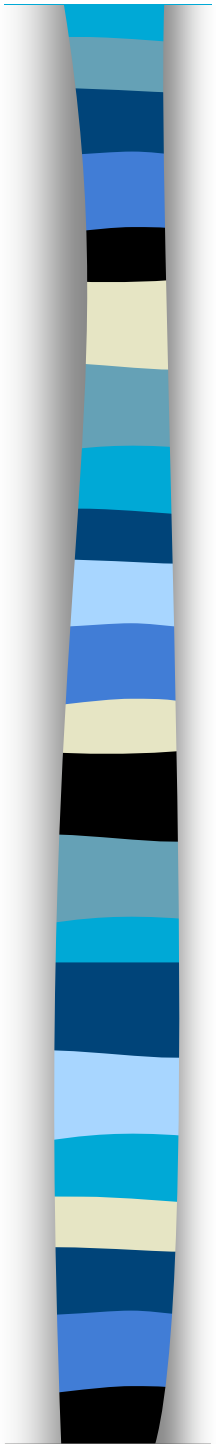
Computer Music



General and brief overview of the field from an artistic perspective

IN FIFTY MINUTES!!!!!!



Roadmap

- Approach
- History
- Fields
- Technologies
- Open topics
- Journals, conferences, and centers

Approach

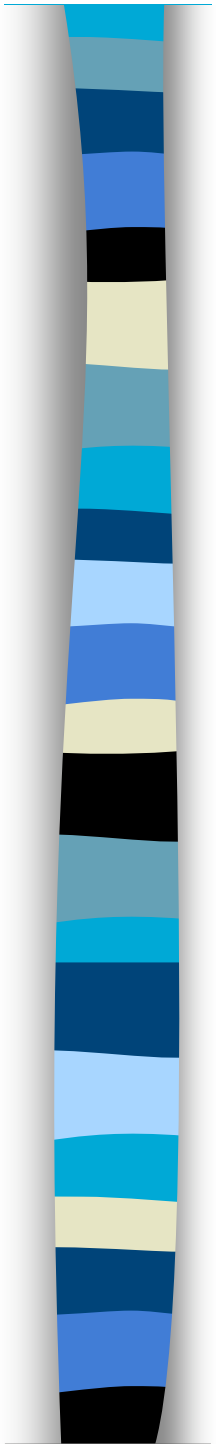
- Use, evolution and development of the field (as a praxis) for solving musical questions.
- Computer music as a natural development of electronic music.
- Use of computer for simplifying and automating compositional techniques.
- Use of computer for exploring sonorities.
- Interdisciplinary field of art + science + technology

History (without computers)

- *The Art of Noises*. Futurist manifesto, written by Luigi Russolo 1914.
- Electronic instruments, Theremin 1920 and Ondes Martenot 1928.
- Tape recorder. Pierre Schaeffer, Musique concrète. *Traité des objets musicaux*. 40s
- Elektronische Musik. Karlheinz Stockhausen 50s
- Edgard Varèse as the “father of electronic music” *Déserts 1954*, *Poème électronique*
- And a HUGE HUGE list of works and composers.

History (with computer)

- Lejaren Hiller and Leonard Isaacson composed *Iliac Suite* for string quartet in 1957. First algorithmic composition.
- Stochastic music, Iannis Xenakis. *ST/4* for string quartet and *ST/48* for orchestra (both 1962).
- UPIC finished in 1977 by Xenakis



History (software)

- Max Mathews “father of computer music”. MUSIC I 1957 to V. IBM mainframe and FORTRAN
- MUSIC 360 (written by Barry Vercoe at MIT, descended from MUSIC IV-BF)
- Csound (not so historical)

Fields

- Assisted composition
- Algorithm composition
- Computational musicology
- Digital music (composition and performance)
- Electroacoustic music (composition and performance)
- Sound synthesis
- Extended instrument.
- New interfaces.
- Audiovisual paradigms.
- Others
- Pure research

Fields - Assisted composition

- The musical content driven by the composer.
- Simplifying repetitive tasks.
- Solving series, sequences, organizing and classifying material.
- Spectral music as an school that exist only with sound analysis.

Fields - Algorithm composition

- The composer write (or draw) numerical representations of a musical process. The concept can be extended to the entire production of the work.
- David Cope as a reference.

Fields - Computational musicology

- Use of the numerical capabilities and speed of the computer for study and analyze musical material. In the pass representation models and now more and more the audio content.
- Data mining
- Numerical Model
- Classification and recognition of styles

Fields - Digital music

- Use of sound synthesis, manipulation, and transformation for creating musical compositions.
- The term is use as a encompass all sonic category in ArsElectronica.
- New Media film soundtracks, installations, soundspace projects, radio works, net-music, generative musics,
- Electronica- as in Dub, Techno, Microsound, Ambient, Global, Minimal, HipHop, Jazz, Noise, Downtempo, Drum'n Bass, Mondo/Exotica, digital DJ-culture, Mash-ups, Music videos, Glitch, Plunderphonics
- Computer compositions (algorithmic, acousmatic and experimental)

Fields - Electroacoustic music

- The more “classic” side of the story as direct continuation of the tape music.
- Use of computer for mixing with acoustic instrument.
- In the old format of tape and the new formats of real-time transformations and “score followers”

Fields - Extended instrument

- Use of electronic devices for extending traditional instruments.
- Digital extensions
- Hardware extensions
- Hyperinstruments

Fields - New interfaces

- Creation of entire new instruments and new paradigms for playing them. Therefore new concepts of performances.
- ReacTable*

Fields - Audiovisual paradigms

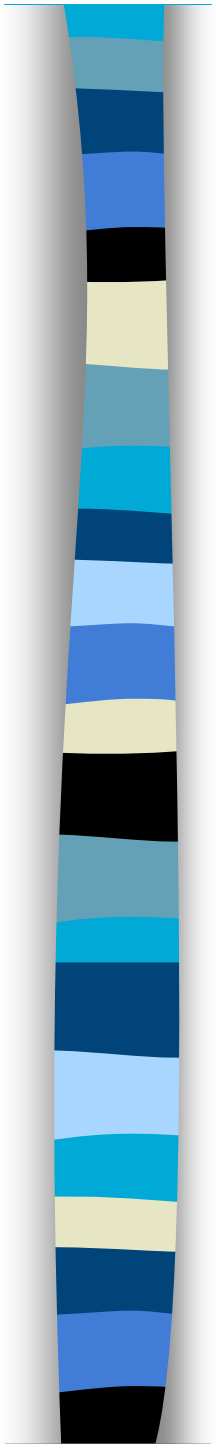
- Concepts, research, paradigms, and execution of music + graphics
- Data visualization
- Audiovisual experiences
- Audiovisual music

Fields - Other examples

- Extending the sonic exploration outside the “concert” format.
- Extending all the previous areas to the improvisatory field.
- Live coding.
- Sound Installations.
- Software-art.
- Radio art.
- Soundscape.
- Net-art and telematic art.

Fields - Pure research

- Sound synthesis. AM, FM, Granular, Physical Model (high-level control).
- Sinusoidal Models, ATS by Juan Pampin at UW.
- Concatenative Synthesis.
- AI + sound
- Models of composition, listening, and performance. For example Narmour, 1990, Lerdahl and Jackendoff 1983.

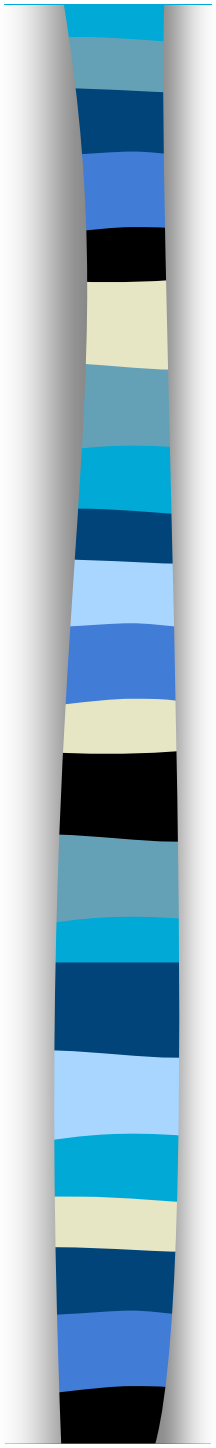


Technologies

- Sound Synthesis
- Score editors
- Audio editors
- Compositional tool kits
- Sound analyzers
- Music analyzers
- Commercial software

Technologies - Sound synthesis

- Csound by Barry Vercoe at MIT with contributions by many people such as Richard Karpen.
- Pure Data / MaxMSP by Miller Puckettee and many many others.
- SuperCollider by James McCartney with contributions by many others such as Josh Parmenter
- Jsyn
- Chuck
- Matlab, Matematica and generic languages.



Technologies - Score editors

- musicXML
- LilyPond
- noteAvility
- Finale
- Sibelius
- Jscore

Technologies - Audio editors

- Single Channel
  - Audacity
- MultiChannel
  - Ardour
  - ProTools
  - Digital Performer
  - Logic Audio

Technologies - Compositional tool kits

- MaxMSP
- JMSL for Jsyn
- CTK for SC
- OpenMusic
- Most interesting cases are personal implementations.

Technologies - Sound analyzers

- ATS Analysis - Transformation - Synthesis (ATS)
- SPEAR - Sinusoidal Partial Editing Analysis and Resynthesis
- AudioSculpt and Diphone
- SDIF format

Technologies - Music analyzers

- Meapsoft
- Many personal research tools
  Skeleton, SMS.

Technologies - Commercial software

- Sequencers, midi editors, accompaniment systems, karaoke systems, virtual DJs.

Open Topics

- Automatic transcribers.
- Sound and music classification.
- Sound synthesis of real instruments.
- Models of composition, analysis, and performance. (Gesture and high level understanding)
- Audiovisual interfaces.
- Industrial and commercial issues such as compression, fingertips, water markers.

Journals, conferences, and centers

- IRCAM (Paris), CCRMA (USA), HUT (Helsinki), Queen Mary (London), Sony-CSL (Paris), University of Genova, KTH (Stockholm), MTG-UPF (Barcelona), DXARTS (USA), Media Lab MIT (USA), and many others.
- ICMC, ISMIR, NIME, DAFX, and others.
- CMJ, JNMR, JMM, and many others.