

## GABOR'S LEGACY: NEW DEVELOPMENTS IN GRANULAR ANALYSIS AND SYNTHESIS

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### ABSTRACT

Granular synthesis has evolved from the theories of Gabor and Xenakis into a broad range of techniques that treat sound as a stream of acoustic particles.

This lecture traces the particle paradigm from its origins to the present day. Through myriad sound examples, I will demonstrate the power of the particle paradigm as a tool for synthesizing transforming sound. Some of these examples will be drawn from my book *Microsound* (2002, The MIT Press).

I will demonstrate *PulsarGenerator*, a program developed by Alberto de Campo and me for particle sound synthesis. *PulsarGenerator* was inspired by the sounds of the early analog electronic music. After a brief presentation of the matching pursuit wavelet transform, which Garry Kling and I will present at another point in this conference, I will unveil a new program for generalized control of particle synthesis, *EmissionControl*, developed by David Thall and me. Finally, I will present examples of music realized with particle techniques with accompanying videos by Woon Seung Yeo and Brian O'Reilly.

**Curtis Roads** teaches in CREATE, Center for Research in Electronic Art Technology, in the Department of Music and also in Media Arts and Technology (MAT), University of California, Santa Barbara.

He studied music composition at California Institute of the Arts, the University of California, San Diego (B. A. Summa Cum Laude), and the University of Paris VIII (PhD).

From 1980 to 1986 he was a researcher in computer music at the Massachusetts Institute of Technology and the MIT Media Laboratory. He then taught at the University of Naples "Federico II," Harvard University, Oberlin Conservatory, CCMIX (Paris), and the University of Paris VIII. He has led master classes at the Australian National Conservatory (Melbourne) and the Prometeo Laboratorio (Parma), among others.

He is co-organizer of international workshops on musical signal processing in Sorrento, Capri, and Santa Barbara (1988, 1991, 1997, 2000).

He has served on the composition juries of the Ars Electronica (Linz) and the International Electroacoustic Music Competition (Bourges, France).

Certain of his compositions feature granular and pulsar synthesis, methods he developed for generating sound from acoustical particles.

Upon arrival at UCSB in 1996, he developed the *Creatorphone*, a system for spatial projection of sound in concert. Another invention is the *Creatorvox*, an expressive new instrument for virtuoso performance that is based on the synthesis of sound particles. The *Creatorvox*, developed in collaboration with Alberto de Campo, was first demonstrated to the public in March 2000.

His composition *Clang-Tint* (1994) was commissioned by the Japan Ministry of Culture (Bunka-cho) and the Kunitachi College of Music, Tokyo. His music is available on compact discs produced by Asphodel, MODE, OR, the MIT Media Laboratory, and Wergo.

A co-founder of the International Computer Music Association in 1979, he was Editor of *Computer Music Journal* (The MIT Press) from 1978 to 1989, and Associate Editor 1990-2000.

His writings include over a hundred monographs, research articles, reports, and reviews. Some of these have been translated and printed in Italian, French, German, Finnish, Chinese, Korean, and Japanese. His books include *Foundations of Computer Music* (1985, The MIT Press), *Composers and the Computer* (1985, AR Editions), *The Music Machine* (1989, The MIT Press), *Representations of Musical Signals* (1991, The MIT Press), *The Computer Music Tutorial* (1996, The MIT Press), *Musical Signal Processing* (co-editor, 1997, Swets and Zeitlinger, Amsterdam), *L'audionumerique* (1998, Dunod, Paris), *The Computer Music Tutorial - Japanese edition* (2000, Denki Daigaku Shuppan, Tokyo) and *Microsound* (2002, The MIT Press), which explores the aesthetics and techniques of composition with sound particles.

His electronic music collection *POINT LINE CLOUD* won the Award of Distinction at the 2002 Ars Electronica and is being released as a CD + DVD on the Asphodel label (San Francisco) in 2004.