

Eric Vierhaus  
Shefali Kumar  
Bello, DCMS  
3-29-08

**Final Project Proposal:  
Granular Synthesis and Physical Modeling techniques in modern composition**

Computer music composition has long been at the forefront of emerging digital signal processing technologies. First proposed in the 1970's, the concepts of granular synthesis and physical modeling have become a common compositional technique in the past two decades. Moreover, to fulfill their designs composers are often designing their own software and tools to carry out implementations of the new techniques. The granular synthesis technique involves the creation of sounds by connecting tiny "grains", typically lasting from five to fifty milliseconds in length. By altering the duration between grains, specific frequencies can be imparted to the listener, and careful selection of natural or synthesized grain spectrums imparts an overall spectrum. An asynchronous variation is also used that randomly spaces the onset of each grain, suggesting a "cloud" of sound. The use of this technique in the music of Curtis Roads and Barry Truax will be considered. Physical modeling attempts to imitate the sounds of musical instruments not by applying a changing transfer function, but by building each part of the instrument and emulating their functions. This technique breaks a model into an excitation and a resonator, each of which impart a change in the input sound. The use of this technique in the compositions of Lansky, Jaffe, et al will be considered.

### Works to be cited

Chafe, Chris. "Case Studies of Physical Models in Music Composition." Center for Computer Research in Music and Acoustics, Stanford University: 2004.  
<http://ccrma.stanford.edu/~cc/pub/pdf/phyModMusComp.pdf>

Dodge, Charles. *Computer Music: Synthesis, Composition, and Performance*. 2nd ed. New York: Schirmer Books, 1997.

Roads, Curtis. "Automated Granular Synthesis of Sound." *Computer Music Journal* 2.2 (1978): 61. JSTOR.

---. "Introduction to Granular Synthesis." *Computer Music Journal* 12.2 (1988): 11. .

Truax, Barry. "Composing with Real-Time Granular Sound." *Perspectives of New Music* 28.2 (1990): 120. JSTOR.