Clouds and Clocks
Some Historical Thoughts About Time in Computer-assisted Music Composition (1955-2015)

Jean-Marc Wolff
Paris Sciences et Lettres, France

All human activities take place over time (Mainzer), each with its own temporality which itself evolves over time (Hartog).

This paper is part of a historical reflection (Leduc) on the way that temporality is articulated in music and in computer technology, two domains whose temporal logics are initially very different (Kramer, Berry, Pressing)

More specifically, this paper focuses on my specialism: the practices of composers of academic computer-assisted music. It concentrates on the temporal aspects of the act of composition.

An initial phase, beginning around 1955 (Lazzarini, Baudouin, Viel), prolonged the reflections on composition of the period 1900–1950 (Donin). The explosion of calculation speeds in the 1980s allowed "real time" to emerge (Manoury), followed since the beginning of the 2000s by "live" composition time. This has brought computer time and musical time closer and closer together. The research currently being carried out in France, whether in computer science (Berry) or in musical research (Desainte–Catherine, Janin, Assayag) bears witness to convergence and cross–fertilisation between the reflections on time proper to these two fields.

The new types of music that are currently emerging subvert the "traditional" composition process. This movement is part of the general crisis affecting the futurist regime of historicity, and illustrates the growing influence of presentism.

References

[1] G. Assayag, "Creative Symbolic Interaction", *ICMC Proceedings*, 2014.

[2] O. Baudouin, *Pionniers de la musique numérique*, Delatour, 2012.

[3] G. Berry, *L'informatique du temps et des événements: Leçon inaugurale*, Collège de France, 2013.

[4] G. Berry, Cours au Collège de France; Année 2012-2013: L'informatique du temps et des événements; Année 2013-2014: Le temps élargi: horloges multiples, temps discret et temps continu.

[5] M. Desainte-Catherine, A. Allombert, G. Assayag, "Towards a Hybrid Temporal Paradigm for Musical Composition and Performance: The Case of Musical Interpretation", *Computer Music Journal* 37(2), 2013, pp. 61-72.

[6] N. Donin, L. Feneyrou (eds.), *Théories de la composition musicale au XXe siècle*, Lyon: Symétrie, 2013.

[7] F. Hartog, *Régimes d'historicité: présentisme et expériences du temps*. Seuil, 2003 (*Regimes of Historicity: Presentism and experiences of time.* Colum-

bia University Press, 2015).

[8] D. Janin et al., "The T-Calculus: towards a structured programing of (musical) time and space", Bordeaux, LaBRI, *CNRS UMR 5800 Report*, 2013.

[9] J. Kramer, "Le temps musical", in Nattiez, J.-J. (ed.) *Musiques, une encyclopédie pour le XXIe siècle, volume 2: Savoirs musicaux*. Cité de la musique, 2004, pp. 189-218.

[10] V. Lazzarini, "The Development of Computer Music Programming Systems", *Journal of New Music Research*, 42:1, 2013, pp. 97-110.

[11] J. Leduc, *Les Historiens et le Temps*. Seuil, 1999.

[12] K. Mainzer, *Zeit. Von der Urzeit zur Computerzeit*.

C.H. Beck, 1999.

[13] P. Manoury, *La musique du temps réel: entretiens avec Omer Corlaix et Jean-Guillaume Lebrun*. Editions MF, 2012.

[14] J. Pressing, "Relations between musical and scientific properties of time", *Contemporary Music Review*, 7(2), 1993, pp. 105–122.

[15] N. Viel, *La musique et l'axiome: création musicale et néo-positivisme au 20e siècle*. Delatour France, 2014.

[16] A. Sorensen, B. Swift, A. Riddell, "The Many Meanings of Live Coding", *Computer Music Journal* 38(1), 2014, pp. 65–76.