# Master's Thesis : Abstract

This dissertation deals with the historical and cultural conditions from which stems the practice of sound assemblage. It aims to set together/gather the elements allowing to comprehend the complex field of contemporary music creation: observing the practices and tools, as well as the major role of visual representation in the organization/arrangement of sounds.

Writing the music

Throughout history, mankind has set up means to capture, memorize and transmit the musical sounds that have deeply altered our relationship to sounds. With the musical notation, human being has acquired a more efficient and more objective approach (despite its restrictiveness). A writing system is a vector of knowledge, creation, conception, conservation and communication at the same time. By extending the composer's mental capacities, music notation has contributed to the elaboration of an always more sophisticated musical thought/reflection. It's a prime cognitive tool.

The firsts "assisted" composition systems

At the end of XVIIth century, small musical "games" appeared, sometimes considered as prototypes for computer music. Their purpose was to allow novice users to easily bring together, randomly or with the help of combinatory principles, a pre-composed musical material, divided into sequences. These games seem to match the concept of a composition tool : they provide a pre-written material, the organization of which is left to the choices of the user, facilitated by a set of rules. If these systems don't allow to apprehend all the rules of music composition, they can become a good source of melodic inspiration. The user approaches creation by building structures, within which a more or less important part has first been supported by the system's designer. We then realize that the space of creation is divided in two parts: the design of the tool and the outcome of the manipulation of its material.

The score, means of elaboration and support for/medium of a dialogue

Another key point of this research deals with the figure of the music composer that emerges during the Renaissance due to the evolution of western traditional music notation. Because of his mastery of the notation system, he is able to elaborate and convey instructions to the performer for playing original creations. Between him and the performer, the score is both a link and a border.

Traditional western notation, built on a paradigm of pitch and time, enforces/imposes a way of thinking music that is limited to the writing rules inherent to its system. This observation has led the avant-garde to question the conventions of writing and creation, and to experiment in the field of "graphic notation". Graphic forms have indeed been a rich experimental ground to free from the formatting related to the model, for the formulation of new musical ideas, especially new ways of communicating between the composer and the performer. The score became the support of a dialogue from which the work emerges.

New languages, new paradigms

Since the first computer-assisted works (Hiller & Isaacson, IBM) one searches to model the rules of music writing. Many researches find in the "electronic calculator" the ideal ally in this effort to "elaborate a set of rules (...) likely to order the various components of sound in a satisfying way to make it a music artwork" (Pierre Barbaud, Groupe d'Acoustique Musicale, Bulletin n°2, 1964). Quickly, new languages appear to prescribe sound, generating new creative fields to explore: complex processes, randomness and control...

Computer Assisted Composition

The rise of calculation tools and their new languages have had a certain influence on

the way we think about sound and on the creation process. Indeed, creation process finds its conditions in the set of constraints constituted by the body, the tool / instrument, the language used, the notation system / interface... It's from this set that composers will experiment then create. It influences the formalization of musical ideas and generate formal expressions that might not have emerged in other contexts.

Language, model, constraints...

Since early works in algorithmic music, musical notation has merged with new languages specialized in the mathematical formalization of music. The software is a score and an instrument at the same time. The sonic phenomenon is modeled using objects determined by rules: this is the Constraint Satisfaction Problems method. The composer chooses the rules that are going to guide the elaboration of his musical idea. An open programming environment allows (with an effort in the formulation) to emancipate from constraints of too-determinists models and to reach a great freedom in decisions.

Accompaniment of the novice user

Open systems bring on the question of learning, because softwares' designers have to give keys to use their programs without leading the user toward a precise model. How is the novice accompanied? What are the learning modalities? What are the bridges between authors and users? At the intersection of the researcher and the composer, between technical purposes and practical needs, it is the designer's role to set up the means that are going to facilitate the diffusion of knowledge, accompany the use of tools and encourage creation.

Music composition today

Musical creation has democratized, it attracts many amateurs and now constitutes a rich and complex domain. However, in order to satisfy practical needs that occur during the creation, the composition process must become a central preoccupation. Various observation protocols help us learn about a certain sequence in composition. There seem to be two steps in composition: the inspiration (emergence of the initial idea, sketching) and the expansion (through various transformation processes). These two steps have been guiding me in the production of two prototypes : "Form" (creation of a musical idea, collection of these forms in an lexicon) and "dyScore" (development and expansion of an idea according to various concepts inspired from musical analysis).

Appropriation of a sound piece

The composer is mostly uncertain of what his production is going to cause in the audience's mind, as the reception may vary depending on cultural background and individuals paths (Chomsky & Schenker ; Nattiez & Molino). The hypothesis is that a tool accompanying the formulation of a musical idea could be extended to the reception matter, enabling the auditor to recognize forms, to enrich their perceptive experience. Studying the "score" before or while the sound is played could allow him a better understanding of what the composer is trying to stir, provided he's able to read it. Music seen and heard, as described by Murray Schafer, brings a higher involvement and satisfaction of the auditor, because it stimulates the imagination.

From isolated composer to "players" networks

The figure of the composer no longer matches the reality and diversity of today's practices in musical creation. Newborn applications, from musical games to complete production environments, from virtual instruments to control surfaces, are inviting users to manipulate, assemble and experiment: we all become "players" on systems that must be conducive to exploration, learning and arouse interest by listening, observing, manipulating, touching...

On the other hand, networks bring a new shared experience, around listening, learning and creating. They generate creativity and raise new world-opened communities, dissolving the borders between high brow and popular cultures.