Florence Baschet

Titre de l'oeuvre :
BogenLied

Date :
2005

Durée :
11.40 mn

Commande :
Commande l'association Cumulus, festival Why Note

Effectif :
Violon aiugmenté solo et dispositif électroacoustique temps réel

Création :
Le 26 novembre 2005 au Parvis Saint Jean, Dijon
Anne Mercier, violon soliste de l'ensemble L'Itinéraire.
Concert en co-réalisation avec l'Ircam, Réalisation informatique musicale Ircam : Serge Lemouton, Technologie violon augmenté Ircam: Nicolas Rasamimanana, Frédéric Bevilacqua, Emmanuel Fléty
Reprise : le 7 janvier 2006 à Radio-France

Notice :
BogenLied (2005) est une pièce pour « violon augmenté » et électroacoustique en temps réel. Ce violon au nom particulier fait l'objet d'un développement de recherche à l'Ircam. Prototype unique, le violon augmenté contient une puce électronique pesant seulement quelques grammes et placée sur la hausse de l'archet du violoniste. Cette puce est capable de capter en temps réel au moment du concert, les phrasés gestuels que le soliste exécute avec son archet sur les cordes, et de transmettre ces informations à l'ordinateur placé au centre du dispositif électroacoustique.
Pourquoi le phrasé gestuel de l'instrumentiste est-il à ce point intéresssant ? je répondrai qu'il est l'outil qui élabore le son, celui qui façonne le timbre de l'objet sonore par de multiples qualités de célérité, d'énergie ou de position de l'archet sur la corde. Ce qui m'intéresse donc en tant que compositeur, c'est de placer mon écoute dans ce lieu réservé de l'instrumentiste, de capter ses phrasés gestuels et de créer à partir de ces données, un système interactif d'un genre tout à fait nouveau entre l'ordinateur et le musicien. Car ici, l'espace sonore électroacoustique est entièrement piloté par le coup d'archet du violoniste.
BogenLied est la première pièce écrite pour violon augmenté, commande de l'Association Cumulus, créée en concert en co-réalisation avec l'Ircam par Anne Mercier, violon soliste de l'ensemble L'Itinéraire. Réalisation informatique musicale Ircam : Serge Lemouton. Technologie violon augmenté Ircam: Nicolas Rasamimanana, Frédéric Bevilacqua, Emmanuel Fléty

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I- Introduction

Interactivity and mixed-music.

Over the last few years, my activity as a composer has concentrated on instrumental or vocal works with electro acoustic systems using real time applications. As a matter of fact, I am particularly interested in those musical fields that depend on the interactivity between a musician performing and the resulting electro acoustic issues.

This approach implies three successive motivations:

- to associate the intention that underlines composing for instruments, with that underlying composing for the electro acoustic sound material, with the perspective to create at term, a mutation in musical language conception.
- to center such a musical association - usually called mixed-music - on the performer, (i.e. his interpretation qualities, in the very time he is playing and in the specific place he is performing), in order to bring out all the importance of this lively, singular, fragile and particular moment.
- Finally, and especially with the performance of *BogenLied*, to try to create mixed sound spaces that unite the soloist and the electro acoustic systems into a unique interactive, reactive and sensible relationship, as it is usually the case for a chamber music relationship which unites two musicians, the two parts being in this case the soloist and the computer.

II- Instrumental gesture

Compositional preoccupations.

In our traditional musical culture, we always write strings notation with bow strokes indications as *ponticello*, *staccato*, *martellato*, etc. Thus, bow gesture is a significant compositional parameter. In order to be more precise, I would assert that the gestural phrasing of bowings is the expression of the instrumental thought for strings instruments, especially because such phrasing is the tool that elaborates the sound, that shapes the timbre of the sounding object with the energy, celerity and position qualities of the bow on the strings. All those qualities the bow is transmitting to the string create those numerous timbre variations.

With *BogenLied*, my concern as a composer is to place my hearing and my compositional intention in that reserved spot of the bow strokes, to capture the gestural phrasing of the instrumentalist [1] and to create with these data a new type of interactive system between the soloist and the computer. The basis of this new system is the bowings controlling the electronic audio processes and defining the synthesis parameters of the sound.

From research group's work to concert performance.

In 2004, Ircam organized several research groups working on specific musical issues. These research groups intended to create a perspective of new technologies in association to new compositional challenges. Therefore, composers as well as scientists participated in these working groups. I worked as a composer in the Instrumental Gesture group and then wrote *BogenLied*. Our working process from research group to concert performance was genuinely fruitful. Let me outline two salient features:

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[1] In the upper violon case, a microchip fixed on the bow frog, transmits all the gesture accelerations' data to the Max/MSP program on the computer.

- It seemed very important for me scientists who worked on these new technologies were fully associated and implicated in concert performance with real-time experience, violinist's rehearsals, public concert time, etc.), exactly as I have been concerned with the analysis and investigation works in the research department.
- The iterative process between research and composition generated fruitful feedbacks: e.g. from the analysis database collected by the scientists, I started to develop a musical form whose processes imposed for compositional reasons generated expectations not yet resolved in research and development. And this is just to name a few such benefits.

III *BogenLied* for upper violin and electro acoustic systems

Database

The research group built an excellent database collecting gesture analysis by recording performing violinists. The gesture analysis was related to three standard types of bow strokes, namely *détaché*, *martelé* and *spiccato*. Before starting to compose *BogenLied* for upper violin, I had to translate the graphic representation of the database into musical material to compose (figure 1).

As a composer, I concentrated first on individuating this three classes of gesture recognition in relation to the three types of bow strokes. Furthermore, within each separate class, I was led to differentiate the constitutive points of a same class by their graduate gesture variations (e.g. the variation between a big and a small *détaché*). Finally, I tried to hear a point external to the three classes that would be a hybrid point, analyzed and recognized by its constituent percentages such as a 50% *martelé*, 30% *spiccato* and 20% *détaché*.

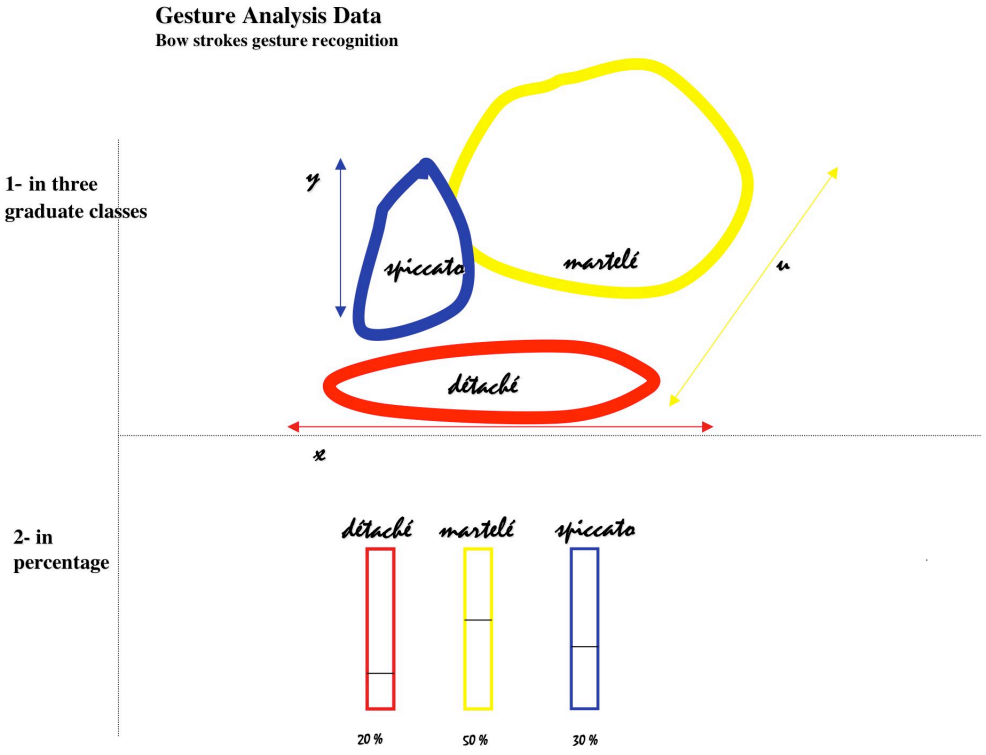


fig. 1

BogenLied form.

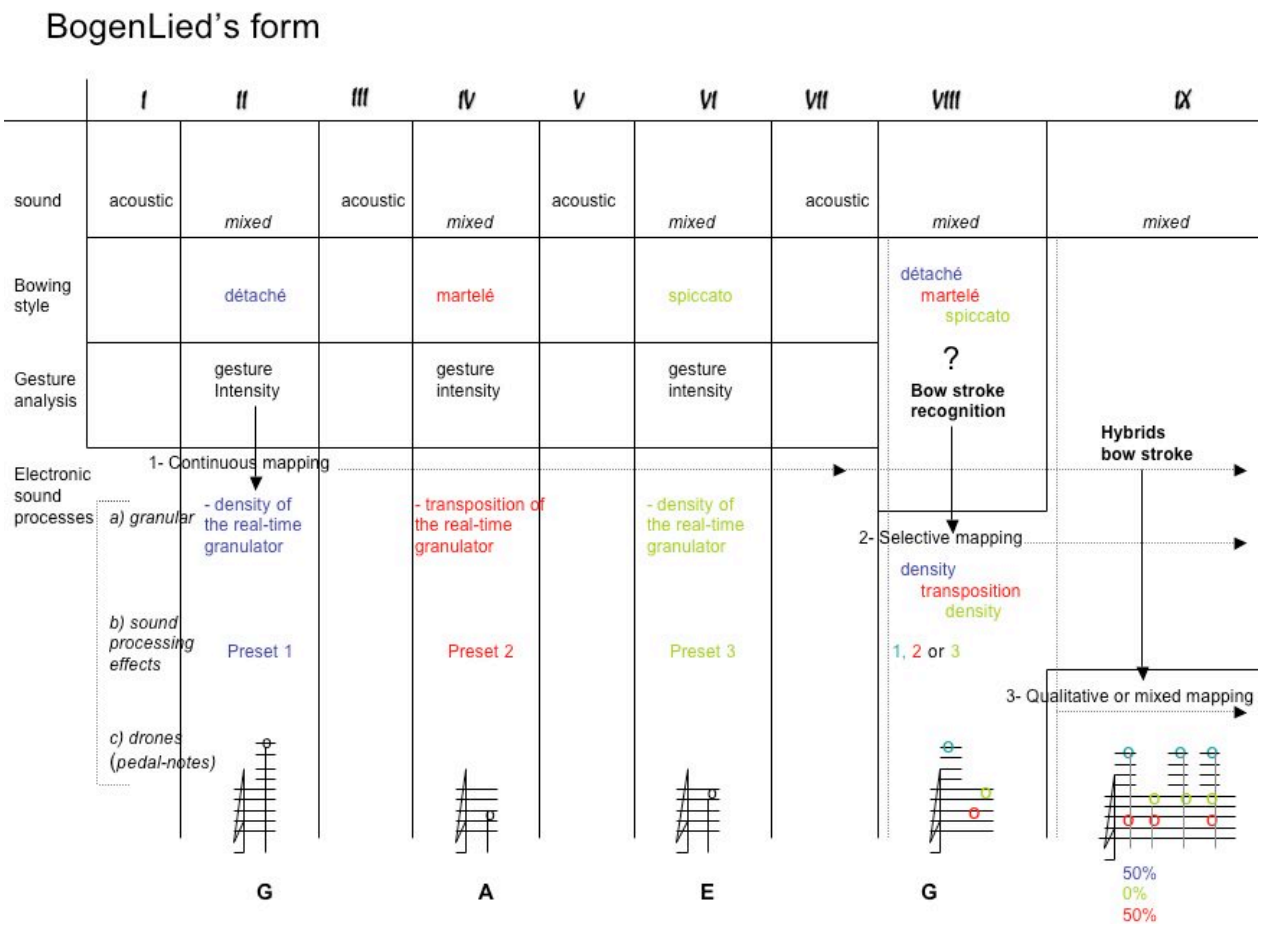
The musical form of *BogenLied* is a simple linear form divided into 9 sections, alternatively with and without electro acoustic systems (figure 2).

In parts II, IV and VI, I focused my writing for the violin on a specific articulation of the bow stroke, associated to a specific compositional material. The gesture recognition program analyzes gesture quality, and particularly the energy rate within the articulation (which is not identical to its dynamics since a violinist can play *piano* with a lot of energy). These energy data are controlling the digital audio processes such as the granular synthesis of the violin sound synthesized in real time.

In part VIII, the three bowings appear successively, together with their own compositional material and related electro acoustic treatment. The related electro-acoiustic treatment is driven by recognition system.

At the end of the score (part IX), the performer plays hybrid bow strokes as a mutation from an articulation to another one. The system uses then the computed weights for each bowstroke to control the electronic treatment.

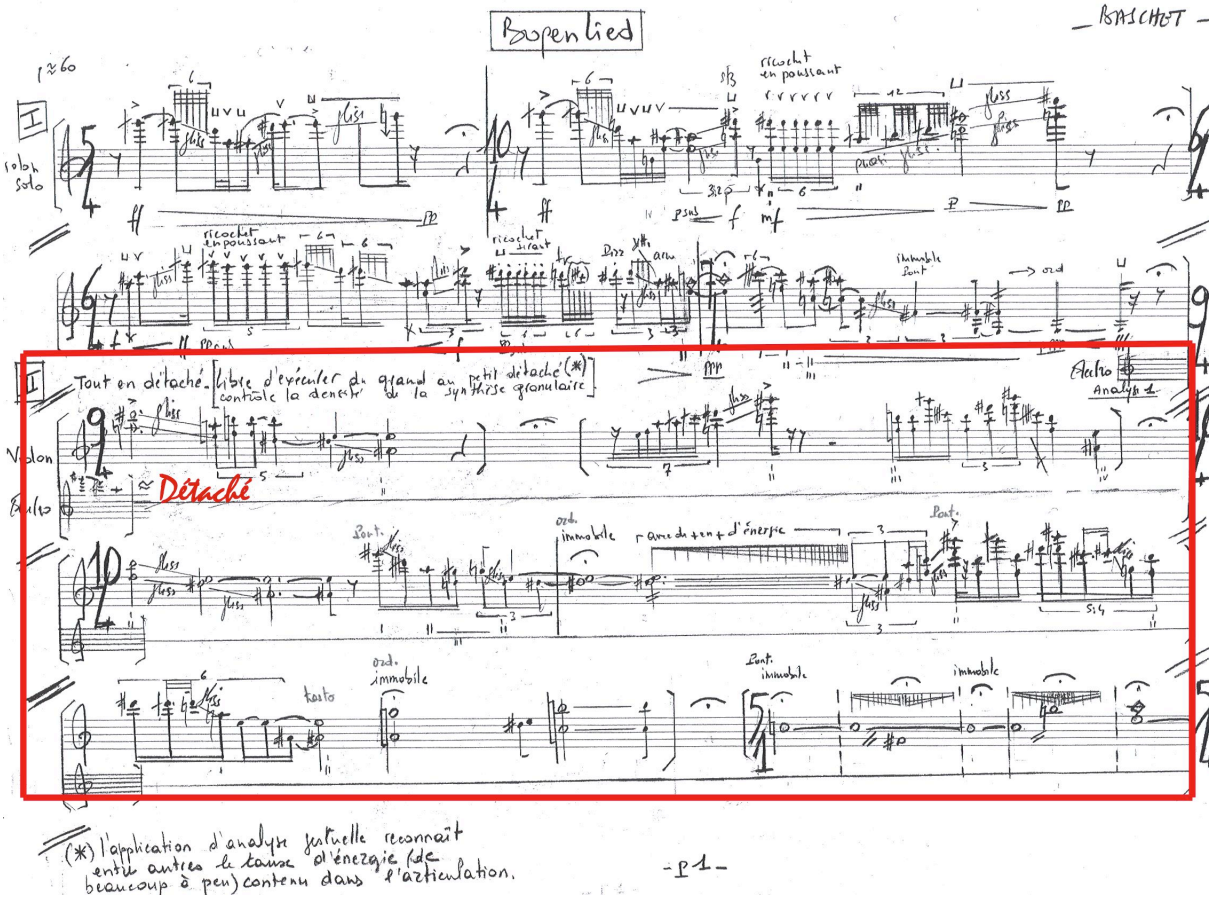
fig.2



Musical notation, example score part II

In this *détaché* part (figure 3), I indicated at the top of the score that the violinist is «free to execute from big to small détaché» as a means to associate the performer to the interactive relationship and to the real time experience. However, the written compositional material lets me keep control of the violinist gesture. Let me give a simple example: in the fourth system in 10/4 of the score, compare the beginning and the end of the system. The beginning is a very slow shape on two strings with glissando. The gesture of the performer cannot produce much energy while playing these 8 bits. Conversely, the end of the same system is written in semiquaver with movements and changements in the tessitura, on two strings and in quarter tones. Such a shape requires many bow strokes and the gesture will be energetic, with the variations generating ample information.

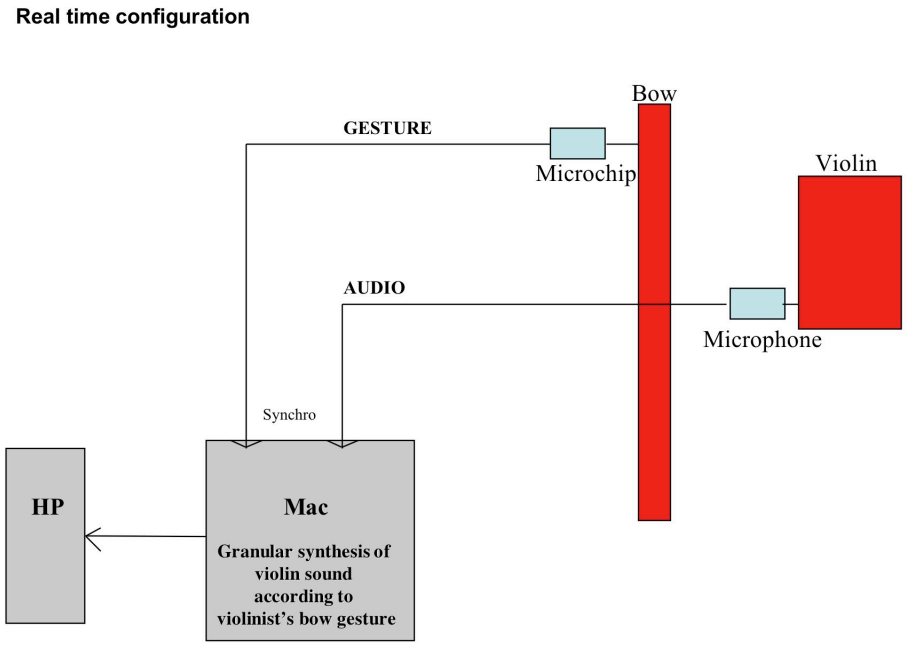
The data on energy rate is related to a granular synthesis variable (in the present case of *détaché*, a great energy of the bow stroke is related to a great density of synthesis grains).



IV Electro acoustic systems

Real-time configuration

The diagram (figure 4) shows the real time configuration at the concert time. The sound of the violin is captured by a microphone and transmitted as an audio signal to the computer. The bow gesture of the violinist is captured by a microchip and transmitted as a gesture signal to the computer. Both signals are synchronized and interpreted on the PC by Max/MSP program. This program makes in real time a granular synthesis of the violin sound according to the bow gesture of the violinist that the auditor can hear in the loudspeakers.



The BogenLied MaxMsp patch (written by Serge Lemouton)

The BogenLied MaxMsp patch contains 2 granular synthesis modules and several effects.
The first granulator is used to produce drones (pedal-notes). The "détaché" section (Section 2) is based on a G, the "martelé" (section 4) on a A and the spiccato section (section 6) an a E.
The second granular synthesis is used for real-time processing of the live violin sound. The signal captured by the microphone is recorded in a 5 second circular buffer~, 100 to 200 ms grains are played from this buffer. The grain density (number of grains playing simultaneously) is controlled by the gesture "intensity" (see below, paragraph ?) in section 2 and 6. In section 4, the gesture intensity is controlling the spread of grain transposition (the sound of small gestures is not transposed, but with strong gestures all the grains are randomly transposed around the played pitch). The granular synthesis are processed through several classical effects : frequency-shifter, harmonizer, filter and vocoder. Each section is characterised by the use of different combinations and parametrizations of these effects. Finally the electronic sound is sent to a "Spatialisateur" to be rendered by a hexaphonic sound diffusion system.

Gesture Mappings:

The signal coming from the gesture sensors and the analysis of this signal are mapped to the sound processing patch using the three following different modalities :

a) quantitative mapping : The gesture intensity controls continuously the density or the transposition of the real-time granulator.

b) discrete selection : In the last part of BogenLied, the bow-stroke recognition is used to choose the transformation corresponding to the played articulation. In this section, a detaché note triggers the transformation used in section 2, a martelé recalls the effects of section 4 and a spiccato recalls the presets of section 6. The three bowings appear successively, together with their own compositional material. The related electro-acoustic treatment is driven by the by recognition system.

c) qualitative mapping : At the end of the score (part IX), the performer plays hybrid bow strokes as a mutation from an articulation to another one. The system use the computed weights for each bowstroke to control the level of the pivot-note associated with each articulation. For instance, a bow-stroke between martelé and detaché will be reported by the knn method with the proportion (50%, 50%, 0%) and, consequently, accompanied by the musical interval G - A, and so on. Every bow-stroke is coloured by a combinaison of this 3 pitches reflecting continuously the quality of the articulation. With this very clear audio feedback indication, the player can really interact with his/her electronic accompaniment using a subtle bow control and the listener can understand the relation between the played articulation and the sonic result.