Emergent Spaces – Subjective Sonification of Spaces. An Artistic Approach

By Lula Romero

Introduction. Space and Spaces

Different conceptions of space involved in computer music practices influence the aesthetic result of the musical work differently. Post-serial space understood as structure has different aesthetic results than the concept of space as place, as it has been conceived of in sound art, the abstract and acoustic space of practices that employ technologies such as ambisonics, or the notion of space as bodily presence and embodiment. In what follows, I describe the concept of space inherent to my practice and how it is concretized in my artistic approach to the practice of sonification that I have called *subjective sonification* of spaces. Finally, I discuss and exemplify this practice and its aesthetic consequences in a case study, the work *Dérive* (2017) for live electronics and string quartet.

In my practice, space plays an important role in creating a multiplicity of experiences and understandings for the listeners. For me, space, instead of a frontier to conquer, is an opening. Parameters and networks of relations have a spatial dimension and materials are the results of combinations of spatial processes instead of merely being distributed in space. This implies a relativist and relational conception of space similar to the concept of space described by the sociologist Martina Löw, which she sets off against absolute and relative or phenomenological conceptions (Löw 2016). Löw describes space as a relational arrangement (*An-Ordnung*) of social goods and bodies that are in constant motion, so that the arrangement itself is always changing. Beings have an agency to shape and create spaces but also social goods, such as sounds or odors influence the creation of space and the arrangement of beings (Löw 2016, p. 129). In Löw's conception, space is not preexistent but rather emerges by virtue of elements and their relational connections. Moreover, the perception of spaces, how they are imagined, regulated and institutionalized, plays an important role in its constitution and continuous transformation. Space is not only a placement of bodies and their actions but also its perception, conception and

institutionalization. All these aspects influence the constitution of space, its characteristics and its transformations (Löw 2016, p. 189). In my compositional work, I understand space similarly to Löw's relational concept, as a dynamic system of interactions between objects, structures, social relations, and actions. Therefore, material but also space itself emerge in the encounter between the network of relations, listeners, sound sources, performers and the acoustics and dimensions that constitute the performance space. Space is also in continuous transformation during the compositional work. There is not a prior space that remains the same throughout the course of the whole piece, rather the different relations established by sound materials and sound sources among themselves, create and transform space. The listener, due to their position in relation to the sound sources, establishes their own links and relations with the sound material. In turn, the listener's perception, expectations, and understanding of sound events modifies their experience of subsequent sounds events of the musical work. Space in my compositional practice emerges in performance and it is not equal to its geometrical representation. Still, the emergence of an open space is not granted by merely positioning sound sources and listeners in a hall. To allow for the emergence of an open space, I use specific compositional strategies, one of them is that of *subjective sonification* of spaces.

Subjective Sonification, case study Dérive

Subjective sonification explores the aesthetic consequences of three different ideas: the role of subjectivity in sonification processes, the concept of *dérive* (Debord 1958), and the notion of musical structure as a translation of a real physical space. In sonification processes, there is always an element of subjectivity in the interpretation of the data into musical parameters or musical transformations. However, as the molecular biologist and philosopher Hans-Jörg Rheinberger points out, the data collected in scientific experiments are not themselves strictly objective (Rheinberger 1997). Data do not present the phenomenon in itself; they rather represent it, hence, they include an element of interpretation and thus

subjectivity. Following this idea, *subjective sonification* explores the repercussions of this element of subjectivity, not only in the translation of the data into music but also in the collection and creation of the data themselves. Hence, the method has two parts: the collection and creation of subjective data and their sonification in a sound work.

Collecting Data and Mapping

Dérive (2017) for string quartet and live electronics is the sonification of a walk in Berlin.[1] The *dérive* is a situationist method proposed by Guy Debord, which "entails playful-constructive behavior and awareness of psychogeographical effects;" (Debord 1958, 7). In a *dérive* "one or more persons during a certain period drop their motives for movement and action, their relations, their work and leisure activities, and let themselves be drawn by the attractions of the terrain and the encounters they find there" (Debord 1958, 7). The data to be sonified in the composition of the piece are the data collected by my subjective *dérive* with the duration of an hour in the city of Berlin. To document my *dérive*, I installed a tracking application on my smartphone that recorded my path. The application also provided different tools for recording and attaching data and media files like text, video, and audio recordings, that were used to record particular observed details, impressions, thoughts, and decisions. This method generates two sets of data:

Figure 1: Map of the walk. Movements and area covered during the walk marked in red. The beginning of the walk is signified with a small red arrow, the end with a square. Blue dots signify pauses, while green dots signify changes of trajectories, impressions or events.

Quantitative data
○ Movements, trajectories, and the area covered as collected by the tracking application (figure 1).
○ Duration and velocities of the trajectories and pauses.
Qualitative data – "Walk diary"
○ Events and motivations for each change of direction.
○ Subjective impressions recorded in photos, texts, sound recordings, videos.[2]
○ Field recordings (audio files).

A subjective mapping is applied to the collected data during the composition of the piece. The sounds of the walk – either as direct recordings or as my transcriptions-interpretations of the events of the walk – are the sound material of the piece. The data collected – the different stages of the walk and their velocities and durations – provide the basis for the development of the macro- and meso-structure of the work, while trajectories and movements are a model for the spatialization of the sound. The 60 minutes temporal range of the derive, its different speeds and rhythms are reduced by dividing them by four (around 15 minutes). The total area covered by the walk is reduced to the dimensions of the performance space in which the sound sources are placed in such a way that they trace the contour of the walked area.

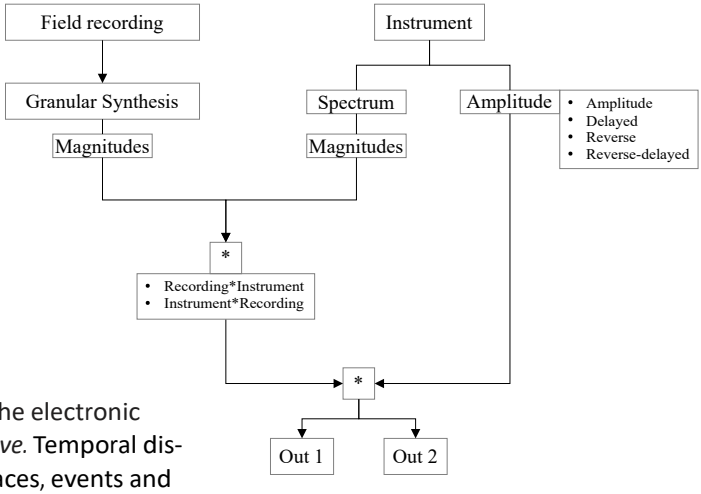

Figure 2:
Flow chart of the electronic process in *Dérive*. Temporal distribution of places, events and impressions during the walk

Transformations of the Field Recordings

The different field recordings collected during the walk are not presented as such but they are live processed with granular synthesis at different moments in the piece. The grains of the synthesis are considerably large – 2.5 seconds – while the density of grains is low – on average of 5.5 random impulses per second. After the processing, the transformed field recording retains some of its sonic characteristics while its referential content is blurred. I processed the results of the granular synthesis process further by convolving it with the sound of the string instruments (figure 2).

The sound of the instruments is recorded and their amplitude envelope and spectral content is analyzed during the performance. I used a process that multiplies the magnitudes of the frequency spectrum of two signals and applies the phase of the first input. Two outcomes are possible:

1) field recording * instrument – the sound result is the field recording spectrum multiplied by the magnitudes of the spectrum of the instrumental sounds – and

2) instrument * field recording – the signal of the instrument works similarly to a resonant filter of the spectrum of the field recording. The piece alternates between these two options for each instrument. Afterwards, I multiplied the resultant four signals – one for instrument – with the amplitude envelope of each instrument. Still, the amplitude envelope of the instrument is used in four different ways: amplitude without processing, delayed amplitude envelope, inverted amplitude, or inverted and delayed amplitude. These four possibilities are applied at different moments to the electronics.

The sound of the instruments modifies and transforms the field recordings. Instead of a juxtaposition of field recordings with an instrumental material, *Dérive* displays the outcome of the interference – *intra-action* (Barad 2007)[3] – between the field recordings and the instrumental material. Moreover, the piece shows the intra-action between the spaces of the walk and my subjective perception of them.

Emergence of Spaces

The electronic processing generates four two-channel signals which are each distributed differently in space

and time during the piece. The musicians are positioned around the audience, each one in the center of each side. The speakers are positioned in front of the musicians and around the listeners (figure 3).

The form of the piece traces the walk and is linked to the localization of the sound sources. A main instrumental line, characterized by fast figurations and a louder dynamic level, is defined as the "walker." During the fifteen minutes of the piece, the main line moves together with its electronic transformation, slowly describing a circle from the front left corner of the venue and violin I, going through front, right and rear to arrive on the left side and cello. During the *dérive* of the main line, the other instruments play secondary lines defined by softer dynamics and low activity (figure 4). The sound transformations of these secondary lines are localized on the pair of speakers closest to the instrument playing it. The main and secondary instrumental lines transform the same field recording at each moment. Therefore, the field recording is modified four times by different sound materials and actions and then sent to

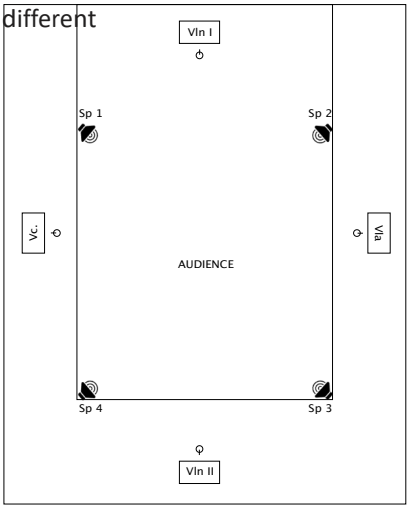

Figure 3: Positions of musicians, speakers and microphones in the performance space (Villa Elizabeth, Berlin).

different speakers. The audience is submerged in an open space of multiple transformations of the field recording and different instrumental lines, while they can still follow the slow movement of the "walker" through this space. Still, the immersion proposed in this work is not a passive and uncritical form of listening (Schrimshaw 2015), but rather an active listening of an event that manifests itself differently in their relations when heard in different positions.

A total of nine field recordings are used in *Dérive* . Figure 5 shows a table of the temporal distribution of the different field recordings used and their content.

The performance hall and its acoustic characteristics influence and shape the sounds and spaces proposed by the work. Instead of trying to abolish its influence, I tried to enhance its characteristics and include them in the work. The premiere of *Dérive* took place in the Villa Elizabeth in Berlin. The hall has very distinct acoustics, since three of its sides – left, right and back – are covered by galleries. I positioned three of the musicians – viola, violin II and cello – under the galleries, while the loudspeakers are on the galleries facing down. The sound of the instruments under the galley is filtered, but also reflected and projected forward. This is important when these instruments are playing the main line. Further performances in different venues will include the specific characteristics of each place in the disposition of sound sources.

As I mentioned previously, my compositional concept of space is a relational one. Space in *Dérive* is a network of sound sources, sound material, their movements among the sources, the musicians' actions, the listeners' positions and their perception, the acoustic characteristics of the performance hall, but also the spatial characteristics of the field recordings, the pitch space, my subjective mapping, and my understanding of space. All these elements have an agency. Moreover, the spaces are not static in time. They are not intended to create a mere immersion of the listener in sound, but they rather develop during the work. Sounds and space – in their developments and different manifestations – offer different perspectives and understandings to the listeners. The piece involves an exploration of different spaces by different strategies during its composition. Furthermore, in its performance, the work proposes the listener an aesthetic exploration of the acoustic, perceived and virtual spaces without imposing any one of them. By doing so, *Dérive* situates itself in a no man's land between experimental electroacoustic composition, instrumental chamber music, sound art, and sound walks.

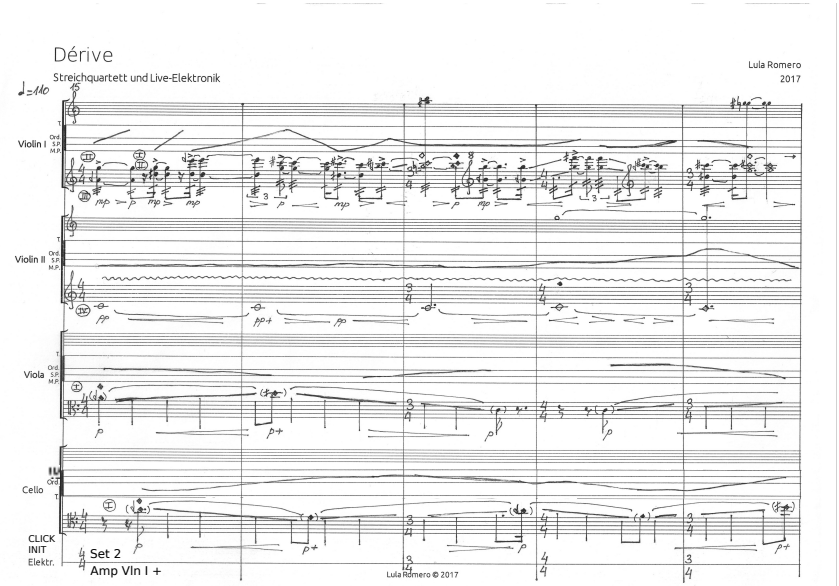

Figure 4: Main and secondary lines at the beginning of *Dérive*. The main line ("the walker") is assigned to violin I, the other instruments play secondary lines.

Time / Duration	Place	Content
Bars 1-44 / 1'30"	Wrangelstraße – Oppelner Straße	people talking background, cars, sound of bicycle locks, cafes, car doors
Bars 45-73 / 2'	Schlesische straße	people talking background, traffic, steps
Bars 74-81 / 28"	Cuvrystraße – Wrangelstraße	birds, small flea mark
Bars 82-104 / 1'46"	Görtlizer Park1	birds, far away ambulance, airplane, wind, families, skates and bikes passing by
Bars 105-113 / 45"	Görtlizer Park2	Dealers, selling calls
Bars 114-134 / 1'37"	Görtlizer Park3	Football players screaming during a game
Bars 135-140 / 41"	Görtlizer Park2	Dealers, selling calls
Bars 141-181 / 3'15"	Paul Linke Ufer	Petánque players talking while playing
Bars 182-211 / 2'05"	Ohlauer Straße	sound of bars, people talking close in English
Bars 212-219 / 1'12"	Skatlizer Straße	cars, people talking close in German
Bars 220-end / 35"	"memory" Görtlizer Park	football players

Figure 5: Temporal distribution of the different field recordings in time

Conclusion

An interesting aspect of this project was to render audible the specific historical and social aspects of places. I am interested in the possibility of referring to such aspects in an indirect way. In my practice, I am resistant to direct references like the use of field recordings. Direct references sometimes entail an unequivocal understanding of a piece and may hinder the openness of understandings that I intend with my use of space. However, the process of *subjective sonification*, in which recordings and transcriptions are transformed and reinterpreted gives me the possibility of aesthetically researching the social aspects of places, while guaranteeing an open interpretation for the listener. The gentrified areas of Kreuzberg in Berlin overflowed with tourism is a heterogeneous, complex place with many frictions and contradictions and with a very particular topography and idiosyncrasy. I wanted to explore these aspects in this piece in an audible way and from a subjective perspective. Through the decisions and itinerary of the walker, in what could be seen as an autoethnographic research, different political and social aspects of the city are made explicit. Hence, the intention of this piece is neither to create a cheerful collage of this part of Berlin nor is it to demonize it. It is rather a way to make this reality visible, to present or "re-present" something that is rendered invisible or disregarded.

It may be argued that by using my method of *subjective sonification*, I am exchanging the direct referentiality with my subjective interpretation, and by doing so I am imposing my own understanding on the listener. On the contrary, *subjective sonification* is ambiguous in nature, it is a nomad in continuous flux. Its presentation of places does not aim to be a definition of the problem but rather, in the sense of Rosi Braidotti a "nomadic figuration," (Braidotti 1994) an explanation of an ever-changing situation in continuous flux that materialized itself in a fluid musical piece. A "figuration" is a method of thinking, a way to conceptualize something that is in fluctuation and in movement. It is opposed to the principle of identity in which the described is identical to the concept that describes it. It does not impose its mimetic reflection

onto the world but rather explores the world in its nomadic *dérive* and in the fluctuations of the world itself. In the same way, I as composer do not exercise my agency by shaping the sound material into a "expression of my self" but rather I am shaped by my encounter with the spaces, sound material and by the concrete knowledge unveiled in the compositional practice.
Subjective sonification of places is the encounter and intra-action – a relational network – between composer, contingent events, sounds, places and its later encounter with the listener and the performance place.

Audio documentation dérive
http://mediathek.slub-dresden.de/ton90002965.html (permalink)

Notes

[1] *Dérive* was commissioned by the *Sonifikationsfestival der bgnm* 2017. It was premiered by Kairos Quartett at Villa Elisabeth, Berlin, Nov. 2017.

[2] For some examples of the media collected in the walk see Research Catalogue "Dérive" by Lula Romero, https://www.researchcatalogue.net/view/375563/376108 (accessed March 14, 2023)

[3] Quantum physicist and theorist Karen Barad understands the creation of new knowledge during research and experimentation as the diffraction of the forces, that is the interference of the subject that conducts the research and the research object. In the similar way, I understand the compositional experiment as the interference between composer and sound material. See "Experiment and Experience" (Romero 2021) which deals with my concept of experimentation in my compositional practice and its relation with the Baradian concept of *intra-action*.

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