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Multiple paths. Towards a performance practice in computer music

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On Multiple Paths

Introduction

The project *Multiple Paths* engages with two main issues: the search for a historical and aesthetic context for the creation of computer music today, and the extraction of musical elements from references to pre-existent music in order to feed them back into new compositions.

My encounter with the sound world of Luigi Nono's music provided me with a starting point to explore my own musical path. I retained several elements of this encounter as particularly relevant to my own questions regarding instrumental identity and practices. Furthermore I perceived that various implications of Nono's work go beyond the specific materials and performers featuring in either his music or my own, and beyond his or my specific historical moments, in constituting a fundamental challenge to traditional definitions of interpretation and composition.

Context

In the quest to define my artistic practice from a technology-independent, aesthetic perspective, I focus on and am fascinated by the possibilities technology provides for manifesting different interpretations of the notion of expansion in sound.

According to my personal experience as both practitioner and recipient, the context for computer music continues to be misrepresented. An underlying assumption is that work involving technology should always start from scratch: technology's potential for musical expressivity, which encourages the construction of personal tools or methods and their problematisation, carries the latent danger that the wheel will be constantly reinvented. Such hyper-personalisation is one of the biggest unresolved obstacles in the development of a shared computer-music practice, mainly because there is little interaction between practitioners other than in sharing technical information.

Performance practice on traditional instruments is very rich; aesthetic developments are informed not only by style but also by how performers gradually outgrew the existent instruments and encouraged constructors to rethink and evolve them. This is not evident for electronic media. An overwhelming focus on the tools employed, such

as the software used or the computer itself, often impedes the development of performative elements. The connection between tools and practices should ideally spawn technological development.

One of my goals here is to disregard technology and shift my attention towards underlying issues. For example, I focus on ideas of historical context or aesthetic affinity as the driving force for the development of computer music practice. I inform my personal practice in electronic media with traditional notions of musical interpretation. I challenge – even force myself – to create repertoire that inspires my musical creativity within the artistic framework of another's practice, thereby (re)introducing collaboration between performer and composer in computer music. Seeking out existing repertoire written for electronic media or pieces that could be adapted for it is at the centre of my musical fascination. In hindsight, such interpretative elements have greatly influenced my compositional endeavours.

A close examination of the tools used by Nono in his pieces with live electronics reveals how he was able to devise performative strategies that helped transcend the limitations and features of the time and place in which these tools were created. These timeless – and therefore very current – musical notions are instrumental to my understanding of musicianship in live computer music, and can be distilled into two categories.

First, the transformation of the physical space over time. This creates a Deleuzian *devenir* for the sounds of others.⁴⁴ The electronic instrument, then, plays with the act of becoming an independent musical voice by transforming the other voices. It attempts *being* something through something else. This is one of my main interests as a practitioner today: pushing the limits of musical expression by means of a “silent” instrument, an instrument that does not produce any sound and that only manifests itself when another instrument activates the physical space. Therefore, it allows the actions and decisions of its performer, or of someone (or something) else, to enter. This leads to communication with other performers that is no longer a linear dialogue

⁴⁴ I explain my choice of *devenir* over *becoming* in the *PLP I* case study.

or exchange of musical material. Rather, this silent instrument creates spaces that can be reshaped, influenced and transformed.⁴⁵

Second, the challenge of the *performative unit*. By *performative unit* I mean the instrumentalist and her or his instrument. In the case of Nono, the challenge is manifested, for example, in *A Pierre* (1985), in the choice of instruments (extremely low register) and of actions for those instruments (extremely soft dynamics at the top of the range of the register).

My initial motivation to create *Multiple Paths (omaggio a Nono)* was to integrate these two musical notions in a new composition. To do this, I took as a starting point the revision and adaptation of the original electronic setups created for *A Pierre* and *Post-prae-ludium* into a single integrated virtual instrument. The process of collaboration with a dedicated group of performers, a recurrent strategy in my previous projects, led to the creation of the initial material, as well as the refining and expansion of the electronic setup.

Project

The point of departure for *Multiple Paths (omaggio a Nono)* was a collaboration between free improviser and double bassist Brice Soniano, composer and cellist Chris Chafe and myself.⁴⁶

My initial aim was to capture those elements in the music of Luigi Nono that I was able to identify during my work on the preparation, performance and recording of *A Pierre* and *Post-prae-ludium* – the merging of the poetic and sounding notions of space transformation over time, and Nono's notion of the *suono mobile* – while searching for my own ways of exposing the potential of controlling this musical space as an instrument through the active manipulation of this space in performance; this is to say, to situate myself on stage, as part of an ensemble, using the resonances and traces of the other instrumental actions as the voice of my instrument. By *resonances* I mean

⁴⁵ The notion of an “independent” silent instrument might lead to confusion due to its sonic dependence on other instruments or sound sources. The “independence” is in the actions and intentions, rather than in the sounds.

⁴⁶ Chris Chafe is the director of Centre for Computer Research in Music and Acoustics (CCRMA) at Stanford University (<https://ccrma.stanford.edu/~cc/shtml/index.shtml>); Brice Soniano is a free jazz improviser from France (<http://bricesoniano.com>).

the trail left by the instrumentalist's musical action; by *traces*, I point to those sounds produced that are not necessarily part of the intended musical discourse.

I developed a set of strategies and tools to overemphasise, freeze and transform the original instrumental sounds while preserving their original timbre as a clear point of departure.

There are three different levels in the relationship between *Multiple Paths* and the music of Nono. The first concerns the approach to instrumental material. I started by asking performers to play their instruments unconventionally. I conducted a series of sessions with different musicians attempting, at first, to come up with small musical units that could be reinterpreted by different instruments. These were initially developed for double bass, bassoon, saxophone and daxophone.⁴⁷

Aiming for a disassociation between physical action and sonic manifestation, I chose to present the daxophone in contrast with the double bass. Both share the same excitation mechanism (bow), but in the case of the daxophone the sound results are somewhat unpredictable. I set up tests where the physical actions could be shared by daxophonist and double-bassist, with (a partial) disregard to their sound results.

Extending this exploratory process, we reached a point where matching actions created sonic similarities between the two instruments. These were later refined into the musical cells to be used in the piece. This refinement translated into a specific action with a consistent sonic consequence: When keeping the bowing at a steady, soft level, the daxophone created a series of upper harmonics that did not sustain for very long. To imitate this, the double bassist tried to excite unattainable harmonics (such as those resulting from a minor seventh interval with an open string) while keeping his bowing as steady as possible.

[Sound example: Double bass]

⁴⁷ Invented by Hans Reichel, the daxophone is part of the idiophone family of instruments (excited by friction) and can be described as a stylised version of a “ruler-at-the-end-of-a-table” sonic experiment. More on the daxophone can be found at Hans Reichel's website: <http://daxo.de/pages/page10.html>.

I conducted a similar exploratory process with a bassoon player.⁴⁸ The initial premise was to grade how many different sounds could be generated from a single fingering. For the tests, we used only the lowest B \flat (all keys closed) and focused on the variations produced exclusively by changes in reed pressure – how accuracy in controlling the increase and decrease of pressure determined the resolution of our new instrument.

The next step was to develop a single musical gesture that could later be reproduced by other instruments. We chose to create a (mechanical) instrumental reproduction of what could be described as one of the most famous clichés of early *Elektronische Musik*: a gradual, accelerating transition from pulse into timbre.⁴⁹

[Sound example: *Kontakte* and bassoon imitation of pulse-to-texture]

These two initial musical gestures (the pulse-to-timbre and the search for an unattainable harmonic) were then used to create the score for the first version of *Multiple Paths*. The score itself represents a second point of connection to Nono, specifically with *Post-prae-ludium*, where the tubist must choose points at which to detour from a delineated path in the score, which in turn affects the material that is received by the live electronics setup, thereby transforming the way this material is redistributed in the physical space.

Multiple Paths is built on these first collaborative sessions, which included a first performance that took place on 20 February 2013 in Ghent, Belgium, with Brice Soniano on double bass and Chris Chafe on networked daxophone, the latter playing from California using the jamLink⁵⁰ technology developed at the Center for Computer Research in Music and Acoustics (CCRMA), Stanford University.

[Video excerpt available at <http://www.youtube.com/watch?v=kq0sK6HMYuw>]

⁴⁸ Dana Jessen, from the US. More information on her can be found at www.danajessen.com.

⁴⁹ Perhaps the better known musical example of this musical gestures comes from Karlheinz Stockhausen's *Kontakte* (1958–1960).

⁵⁰ More information on the jamLink device and technology can be found at <https://www.musicianlink.com/>.

This first version of *Multiple Paths*, given its networked component, served to connect with Nono's ideas about creating unstable musical material by challenging the performative unit, as presented in the analysis of *A Pierre*: the use of networked performance technology (jamLink) in the earlier versions of *Multiple Paths* made it possible to add a dimension of spatial displacement to the piece. The instability of network performance systems (such as jamLink) undoubtedly colours the result; even in their most successful implementations, there are small ongoing discrepancies between sound (in time) and image (slightly delayed).

Multiple Paths expanded in instrumentation into its final version through a process of transcoding the initial musical gestures onto different instruments, always aiming to preserve relationships between the physical actions of the various performers and the sounding results of their actions.

Starting with the initial material generated in the sessions with bassoon and double bass, and the later parallel between physical actions of double bass and daxophone, the process of expansion of the instrumentation followed a sequence of two-by-two; each pair of instruments would share a relative similarity in their physical actions for one of two available musical elements, and one sounding similarity for the other element.

Each instrument, then, ended up having two interventions throughout the piece. The pairs for the final expanded version for eight instruments were:

Flute – clarinet

Violin – piano

Trumpet – guitar

Cello – double bass

Although *Multiple Paths* differs in its result from the music of Nono, mainly in terms of density and the use of silence, I aimed to preserve his strategies for changing the relationship between performer and instrument, as well as his strategies for sound transformation. In that respect, Hans-Peter Haller (Haller 1999: 11) comments that:

Nono was not merely a technical composer, he considered all acoustic phenomena according to musical criteria. He wanted to transform, extend, the natural parameters of

sound such as pitch, intensity, duration, dynamic envelope, and especially that of timbre.

The textural density of the piece was an element I tried to keep constant, irrespective of the number of performers in each version. Each new test iteration allowed the addition of more musicians, but to preserve the essence of the piece, each new instrument was instructed to play in an exponentially fragmentary fashion, so each instrumental line became more and more scattered in the course of the piece. Because of the increasing number of sources that the electronic system needed to analyse and process, it was necessary to elaborate a more discrete score for both the ensemble and the computer performer. With this score as point of reference, it was the task of the conductor to cue each instrument to start a new event, and to cue the electronic performer to start the transformation of that event by the electronic system.

[Image: *Multiple Paths* score]

The final version of *Multiple Paths*, for eight instruments and quadraphonic sound system, was completed in collaboration with and premiered by the Ensemble Modelo62⁵¹ during the ORCiM Research Festival at the Orpheus Institute, Ghent, Belgium, on 4 October 2013.

[Video excerpt available at <http://www.youtube.com/watch?v=HWp6PjaX78c>]

After the manipulation of the physical space over time, and the challenging of the performative unit, the electronic setup constitutes the third connection to the work of Luigi Nono. Developed in the Max/MSP environment, it involves two distinct kinds of processes: first, an array of filters and short delays that create a trail of rhythmic patterns behind each action of the sustained musical gesture; second, a more static environment, similar to the one devised by Nono and Haller for *A Pierre*, consisting of a twelve- and twenty-four-second delay and a filtering system.⁵² Additionally, multiple internal routing choices are available for the electronic musician to modify during the

⁵¹ Under the direction of Ezequiel Menalled, Holland-based Ensemble Modelo62 has championed new music in the Netherlands for over a decade. For more information visit <http://www.modelo62.com/>.

⁵² See the *Reconstruction* case study for the examples of Nono's *A Pierre* and *Post-prae-ludium*.

performance, as in the setup for *Post-prae-ludium*.⁵³ The system was developed during the initial experimentation sessions with the instrumentalists, and tested further in improvisatory sessions with improvisers Keir Neuringer and Rafal Mazur.⁵⁴ The electronic system was controlled by a dedicated interface nicknamed *Phoenix Egg*, an array of distance, ultrasound and gyroscope sensors, developed in collaboration with Lex van den Broek, head of the technical department at the Royal Conservatoire of The Hague.

Reflection

There are two fundamental aspects in my research trajectory that I wished to highlight with this composition. The first is the need for historical/aesthetic context. The connection with Luigi Nono's understanding of the role of live electronic media (and its performers) in composition resonates with my personal understanding of performance practice in computer music today as the fusion of the roles of composer, performer and instrument builder (or, in this particular case, technician). Nono states clearly that the electronic material, even in repertoire earlier than *A Pierre*, and even when it was in fixed form, needed to be played by a performer with artistic skills and curiosity, and that mere technical know-how was inadequate to present the material in a concert situation. Ogborn points out that "throughout the 1980s, in close collaboration with Hans Peter Haller and later André Richard at the Experimentalstudio Freiburg, Nono's compositional activity was centred on a process of interaction with particular, virtuosic performers on the one hand, and with the spaces of performance on the other." (Ogborn 2005: 2)

The second aspect is the material itself. I consider that one of the most salient features of Nono's works with live electronics is the successful manifestation in sound of an aesthetic or, rather, poetic element. An example of this is his *Prometeo*. Fundamentally, the use of real time spatialisation, reverb, filters and delays, which might seem rather simplistic and underdeveloped compared with today's signal processing possibilities, carries an aesthetic and poetic quality, and its careful

⁵³ See footnote 52.

⁵⁴ Keir Neuringer, saxophonist from the United States, and Rafal Mazur, bassist from Poland, are the founder members of the improvising ensemble [*ie*]. They have managed to sustain a transatlantic collaboration for over fifteen years. For more information on Neuringer visit <http://keirneuringer.com/> and on Mazur see <http://www.rafaalmazur.eu/>.

marriage to an equally fragile instrumental sound material, makes Nono's music transcend its apparent simplicity.

The act of paying tribute to someone's work starts with the recognition of personal affinities with the subject. In the case of my view of Luigi Nono, it would have been sufficient to focus on my affinities with his creative musical ideas. However, his deep political views, as reflected in his late musical output, were no longer expressed in explicit themes, but, rather, in the search for a profound change in the way people listened and communicated with each other through music. de Assis points that Nono's music of this period presents "an aesthetic and a politics of the smallest differences, of the finest details, of the barely audible. An invitation to question one's identity and courage for a change". (Assis 2014: n.p.)

Nono's political views are further explored when dealing with the notion of the musical work as a final object. He (Nono 2001: 273-75) stipulates that

[T]oday more than ever the artist has the responsibility to avoid conclusive, finalized results. They must understand that (as Musil says) "it isn't important what *is*, but rather what *could have been*." This does away with all Manicheism, all sectarianism and intellectual rigidity. Right up to the last moment, my new work is open to all possible transformations.

It is the reluctance to escape this questioning, and his willingness and ability to express these views through his musical work – while also succeeding to evade the aesthetic clichés of politically engaged music – which sits in the core of my admiration for him, at times providing comfort in my choice of electroacoustic music practice as a profession.

Appendix

The road towards the full ensemble version of *Multiple Paths* led to an accumulation of encounters with different musicians. Here is a brief account of them:

First encounter: with Dana Jensen (bassoon)

A session exploring the extended use of the reed, which was later presented against the static version of the electronic instrument. The first gesture of the piece grew from

this session. This initial gesture is a comment on one of the earliest musical gestures explored in *Elektronische Musik*: the transition from pulse to timbre.

Date: 12 November 2012.

Second encounter: with Keir Neuringer (saxophone) and Rafal Mazur (acoustic bass)

A free improvisation session, aimed at testing the basic trajectory gestures of the spatialisation controller in conjunction with the selection of the sources (sax, acoustic bass or electric guitar).

Date: 28 November 2012.

Third encounter: with Brice Soniano (double bass)

Development of the second core gesture of the piece: sustained pitches meant to target “unattainable” sounds; in the case of the double bass, trying to sustain and modify the articulation of the seventh harmonic over open strings.

Date: 11–12 December 2012.

Fourth encounter (and first version): with Chris Chafe (networked daxophone) and Brice Soniano (double bass)

The first version of the piece, combining a first transcription of material derived from encounters one and three, and incorporating the network performance element, as well as the spatialisation element developed in encounter two. Given the unpredictability of its sounding outcome, the use of the daxophone helps to highlight the physicality of the gesture, pushing its sound result to a secondary plane. The goal was to stretch the rudimentary articulation abilities of the daxophone towards imitating actions in the double bass, regardless of the pitches resulting from these actions.

Date: 20 February 2013.

Fifth encounter (the full ensemble version): with Ensemble Modelo62

For eight instruments and quadraphonic sound system. Premiered during the ORCiM Research Festival at the Orpheus Institute, Ghent, Belgium, on 4 October 2013.

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