Losing Time

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Introduction

To help my waking up problem I started placing my alarm clock on the opposite end of my room from where I sleep. Once I woke up by myself, without having heard the alarm. I was trying to figure out whether I woke up too early or too late, but there was no clock by my side. Behind the window was the usual winter sky covered with a thick layer of clouds, so I could not tell where the sun was. My body did not give me any signals either. I was not hungry and I could not tell how much awake I was to guess how many hours had I slept. It even seemed impossible to guess how much time ago had I woken up. There was nothing to measure time against and I had been left only with my intuition.

Another example. The clocks on Dutch train stations have a peculiar quality about them: their second hands move somewhat faster than their minute hands. As a result, every time a second hand reaches "12" it stays there for a couple of seconds, waiting for the minute hand to make its step.

Another one. When a music box winds down, it gets slower and slower until it stops completely. It often so happens that I think it has already played its last note but then, after a pause, it plays one more.

Time is confusing. No person could confidently say that they know what it is. The examples above show everyday situations that make me feel confused about time, when I notice an uncrossable gap between my experience of time and what I know about it.

As a composer, I am trying to express my confusion about time in my music. I believe that music has a tremendous capacity of demonstrating this gap between our representation and experience of time: no matter how profound musicians are in their relationship with time they constantly stumble upon the wall of how our understanding of time is easily confused. Most practices of music-making are social, dialogical in their nature, so the main question of my artistic research is how to communicate my confusion about time to other people, and how to make this experience social.

The main reason to be confused about time is the dichotomy between the model of representation and experience. However, to function successfully, musical dialogue relies on these models. The first problem I face in my research is how to find a model that would have a way to show the discrepancy between itself and the experience of time.

Composers operate with models of time different from the ones we use in our daily life. Music offers us a particular dimension of time, the one Sergei Zagny calls "time of artistic perception" (or simply "artistic time") as opposed to "everyday time,"[1] and the organization of this artistic time is the main task

[1] Sergei Zagny. "Structural Analysis of 4'33"," trans. Daniil Pilchen. *KLINK*, no. 2, 11

of a composer. There are numerous ways of organizing it, but, regarding the aforementioned dichotomy, the main two forms of such organization would be the ones based on either measured or unmeasured time, meaning that composers either prescribe the exact duration of each event in the piece or they leave it up to performers. Usually, it is a mix of both, with a tendency to one or another side. An obvious example would be fermatas in classical music. While most of a piece is metricized there can be some moments whose duration is to be decided by performers. An example of an opposite approach would be "action time," a type of temporal organization in which a composer does not precisely notate the durations of events, but invents a set of rules for musicians' interaction, and this interaction gives birth to the temporal organization of the piece.[2] However, even when writing pieces entirely in unmeasured time, composers usually do not go beyond the level of their relationship with musicians, and this time still ends up being measured by the latter.[3]

Hence, if I want to create a confusing temporal experience for others, I need my time to be not just unmeasured, but *immeasurable*. To make this possible, I am looking for *dysfunctional* models of representing time, which can not be properly employed by musicians and also prevent them from using their usual means of measuring time. In such situations, left without any temporal coordinates but still willing to make the dialogue possible, the musicians need to invent new ways of communicating and making use of time—unprepared by me and not programmed in scores.

Temporal authority and temporal anarchy

One of the ways I'm approaching this is by building "failing hierarchies of temporal authorities." By temporal authority, I mean a certain quality of any object, process, or being that we trust to measure time against. To measure time, we usually consult some rhythms, events or movements that are external to our mind, and it can be anything from our heartbeat to the position of the sun on the sky or a wristwatch. In different situations different temporal authorities appear more reliable to us than others, thus are the hierarchies formed. For example, 15 years ago it was still common to hear a person on the street asking "what time is it? I think my watch is slow," but now the satellites have almost exclusive temporal authority over our everyday time. In music, temporal authorities are distributed according to many needs that an ensemble might face at a moment. In an orchestra, such a hierarchy can

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[2] Samuel Vriezen. "Action Time." *Ear Reader*, January 14, 2014.

[3] See *Préludes non mesurés* by Louis Couperin, Jean-Henri d'Anglebert, Jean-Philippe Rameau and others.

be built starting from one desk then to a concertmaster then to a conductor. But sometimes the temporal authority of the conductor can be taken over by a soloist. Thus, the temporal authority can move from one member of the ensemble to another during one piece. In some pieces, these changes are precomposed, e.g., Charles Ives's *Fourth Symphony* employs two conductors, but only the first one conducts all the time, while the second comes in from time to time, becoming a new temporal authority for a part of the orchestra.

In my music, I call temporal authorities "failing" when they reveal their unreliability for musicians. At moments like these, they need to switch their attention to another temporal authority which seems more reliable, thus giving rise to the hierarchy. After every single temporal authority fails to provide musicians with reliable reference to measure time, they find themselves in a situation similar to sailors from "The Hunting of the Snark," which entrusted Bellman and his map to conduct their journey, but the map turned out to be "a perfect and absolute blank."[4] Staring at such a "blank," while still requiring some reference to move on, the musicians need to find new ways of being together as an ensemble, and these are the moments when musicians feel the apparent presence of one another—moments of intense dialogue based on attentive listening and sympathy, when one's action can change another's mode of listening and playing.

In the following chapters, I regard intuitive, experiential and confusing perspectives to time I find relevant to my work, and go through some strategies I use to express them in my pieces. In "How to not understand time," I start with describing the differences between measured and unmeasured time mainly in regard to Henri Bergson and his ideas of *temps* (measured time, clock-time) and *durée* (duration, "real" time) that sets the speculative character of the first and intuitive nature of the second, then go through Messiaen's interpretation of Bergson's *durée* as *durée vécue* ("true" or "lived/experienced" duration), which rejects the idea of duration being purely intuitive and suggests an empirical way to understand it, and conclude with Alexander Vvedensky's idea of radical "not understanding" time in its both measured and unmeasured forms.

"Lost in translation" is devoted to exploring two examples of possible musical strategies of expressing duration in pieces by Kirill Shirokov and John Cage. In "How to be late" I regard simultaneity as a fundamental means of musical understanding of time, explore different forms of simultaneity and our perception of it, look into the duality of simultaneity and succession in their interdependency and transformation of one into another, and how latency disrupts simultaneity, making it impossible and deceiving our expecta-

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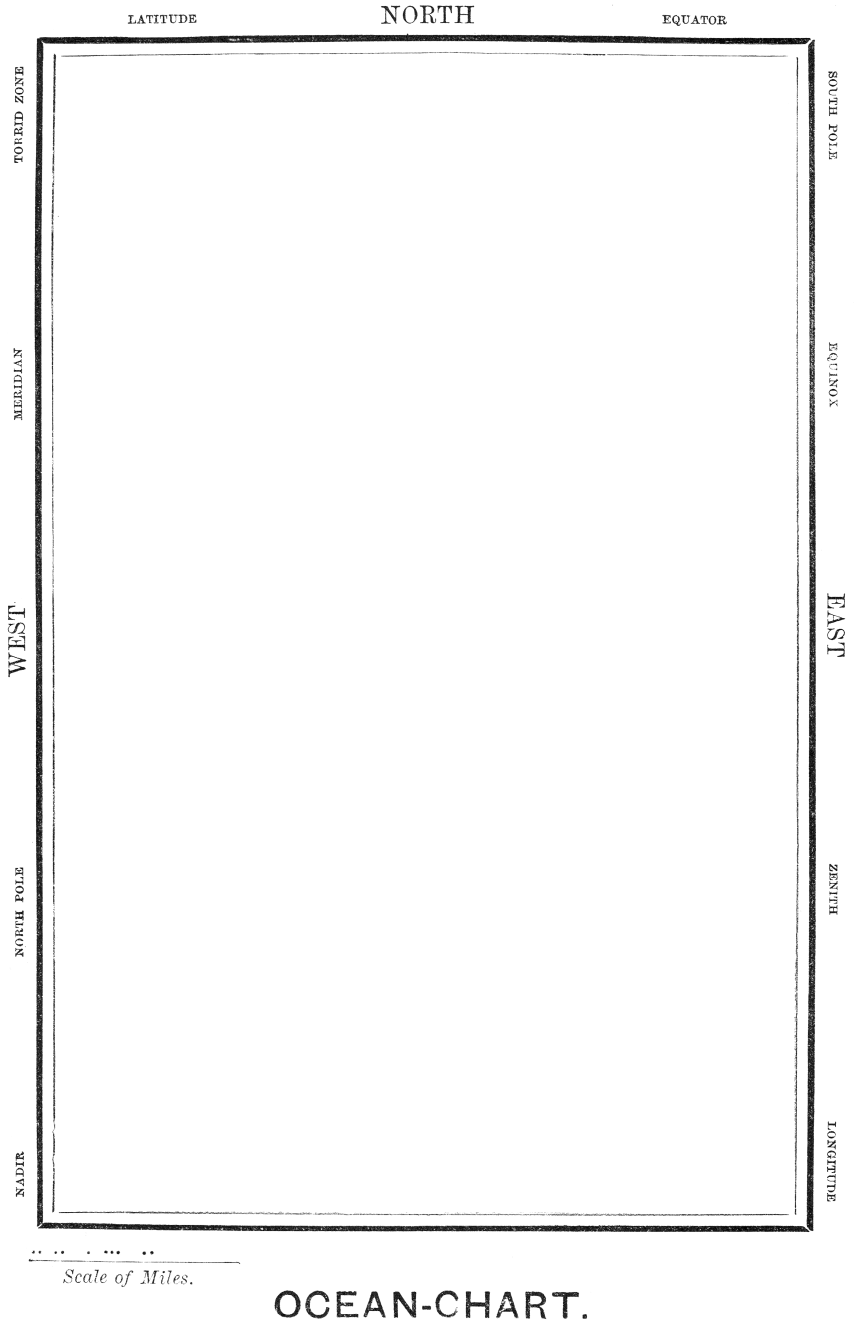
[4] Lewis Carroll. *The Hunting of the Snark*. London: Macmillan and Co., 1876, 16

tion of it, and how unpredictable and altering latency can help us lose our inherent understanding of time.

In "Many songs" I analyze the pieces from my *Songs* series, on which I have been working for the last year and which constitute the core of my research. In these pieces, I explore the concepts and demonstrate the strategies discussed in previous chapters, mainly the failing hierarchies and the impossibility of simultaneity.



How to not understand time

> Time is the only thing that does not exist without us.
> Alexander Vvedensky, *The Gray Notebook*[5]

In this chapter, I talk about measured and unmeasured time from perspectives of Henri Bergson and Marshall McLuhan. Thinking of possible musical applications of Bergson's theory, I analyze its interpretation by Olivier Messiaen. From his compositional perspective, Messiaen offers a functioning musical model of what he calls *durée vécue*—"experienced (true) duration"—although I argue that any functioning model would fail to grasp the unfathomable nature of time. In contrast to this take, I regard the "dysfunctional" models of Alexander Vvedensky and Zeno of Elea.

Durée et temps

Henri Bergson contraposes two ways of thinking about time: one is the time of science, everyday life, and common sense, which he calls simply *temps* ("clock-time"), another is the "real" time of human experience, which he calls *durée* ("duration"). *Temps* can be measured and divided by uniform units, and its divisibility allows us to compare the duration of events by mentally superimposing them one over another in their instantaneity. However, according to Bergson, this way of understanding time is mere speculation, because the "real" time—duration—"eludes mathematical treatment. . . . Its essence being to flow, not one of its parts is still there when another part comes along. Superposition of one part on another with measurement in view is therefore impossible."[6]

The only possibility to divide and measure time then is to translate it into space. In space, we can represent time that has just past as a line and divide it however we want. This representation is possible because our feeling of time is derived from the observation of movements. When we see an object move, we see it change its position in space. But we also memorize where it has been before, and this memorizing results in drawing an imaginary line between the starting and ending points of this movement.[7] However, by making up this visual representation of time we lose the sense of its flow, because "the line one measures is immobile, time is mobility. . . . What is

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[5] Alexander Vvedensky. *The Gray Notebook*. Ugly Duckling Presse, 2013, 8

[6] Henri Bergson. *The Creative Mind,* trans. Mabelle L. Andison New York: The Philosophical Library, 1946, 10–11

[7] Henri Bergson. *Duration and Simultaneity*, trans. Leon Jacobson. The Library of Liberal Arts. The Bobbs-Merrill Company, Inc., 1965, 50

counted is only a certain number of extremities of intervals, or moments, in short, virtual halts in time."[8]

What is the nature of this duration and why does it not comply with the uniform division of the clock? Firstly, at the heart of Bergson's theory of duration is a concept of "multiplicity of conscious states." Intense emotions, evoked in us by, for instance, art or sympathy, result in a succession of their qualitative changes, each of which Bergson regards as a unique conscious state. These conscious states are essentially a part of a single process, hence none of them is equal to another, and each following state is a result of the transformation of the previous one, so it is impossible to draw a line between one and another. They permeate each other, forming a heterogeneous and inseparable multiplicity.[9]

Secondly, the basis for the duration is memory. Memory allows us to spot the difference in processes within ourselves and our environment and it prevents time from becoming a sequence of disconnected and meaningless "nows," constantly creating the link between the past and present—from "what no longer exists into what does exist."[10]

And, since memory is essentially what allows us to see the unfolding of the succession of our conscious states, and this succession, a) never happens uniformly but its speed constantly changes, b) is always qualitative rather than quantitative and c) results in conscious states penetrating each other, thus we cannot draw a line between them and see when exactly one follows another, it cannot be described through the simple uniform motion of the clock hand.

The measure is the message

Measuring time allows us to find a tangible connection between moments of our inner-duration and events outside ourselves, which is crucial for inter-human communication and cooperation. However, with the clock alone, without duration and consequently memory there can be no idea of time at all.[11] Yet the benefits of clock-time are so immense that the very idea of immeasurable duration became almost impossible to comprehend.

The history of the clock resembles the route of translation of duration into motion later divided by uniform units described by Bergson. The very

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[8] Bergson, *The Creative Mind*, 11

[9] Henri Bergson. *Time and Free Will. An Essay on the Immediate Data of Consciousness*, trans. F. L. Pogson. London: George Allen & Company, Ltd., 1913, 17–18

[10] Bergson, *Duration and Simultaneity*, 48–49

[11] Ibid., 51

first clocks were based on the observation of continuous motions: first of the Earth's rotation around its axis—the sundial, then the water clock, and the hourglasses. But the true revolution happened at the end of the 13th century, when the mechanical clock was invented and completely disrupted the continuity of motion (through "momentarily interrupting rotary movement by a crown rod and balance wheel")[12] which, until that day, was the essence of people's representation of time.

Every invention of new technology, according to Marshall McLuhan, is an extension of a part of the human body or an "outering" of a bodily process. This is our way of adapting to the ever-changing—accelerating and overloading our senses—environment. But after the first extension happens, it allows for even more acceleration and overload, which demands new technology and, in the end, results in "amputation" of the body process.[13] Therefore, one could argue that the growing need for more and more precise time-measurement devices led to the raising numbness of our perception of duration.

This new perception of time vastly affected the history of music. Not long after the invention of the mechanical clock followed the rhythmic revolution of *Ars nova*, leading further to an extreme rhythmic sophistication of *Ars subtillior*. At its basis, this sophistication had an idea of dividing core units of time—*tempus* and *modus*—in three (perfect) or two (imperfect).[14] These divisions constitute the core of our understanding of musical time until today, and Olivier Messiaen considered our habit of this division the main reason we cannot perceive duration.[15]

Rhythmist's take

In his *Treatise on Rhythm, Color, and Ornithology* Olivier Messiaen demonstrates a profound understanding of Bergson's theory. Not only does he quote Bergson's works extensively, but he also offers a highly original and transformative interpretation of them, exploring the possibilities of their musical application through his study of Greek metrics, Hindu rhythms, "extra-musical" rhythms, works of classical composers and his contemporaries, and a plethora of other references, including his own works.

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[12] Marshall McLuhan. *Understanding Media*. Routledge Classics. London: Routledge, 2001, 167

[13] Ibid., 46–47

[14] Philippe de Vitry and Leo Platinga. "Philippe de Vitry's 'Ars Nova': A Translation." *Journal of Music Theory*, no. Vol. 5, No. 2 (Winter 1961): 204–223.

[15] Olivier Messiaen. *Traité de Rythme, de Couleur, et d'ornithologie*. Tome III. Alphonse Leduc. Paris, 1996, 225. (*All translations from this book are my own*).

However, Messiaen disagrees with Bergson's understanding of duration as "an inherent trait of consciousness."[16] He believes that duration reveals itself in ever-changing rhythms and velocities of nature, hence it can be read directly from external physical stimuli. He coins a term *durée vécue*, which Melody Baggech translates as "true duration," but it can also be translated as "lived—or experienced—duration." Thus, one can fathom this duration by thoroughly studying dynamic velocities and irregular periodicities of "noises of nature," e.g. in "perpetual variation" of "the undulations of the waves of the sea."[17] This example is particularly important for Messiaen since he sees the movement of water as a definition of rhythm, and rhythm as a direct experience of duration. Analyzing the etymology of the word "rhythm" (borrowing it from *Dictionnaire des racines* by R. Grandsaignes) he starts from the Indo-European root "SREU" (to run) and shows its derivation through Indo-European languages, such as Greek "rhuthmos" meaning "movement of waves," German "strömen" meaning "to run in waves," English "stream," and, in the end, French "rythme."[18]

Rhythm is essential for our experience of duration, which Messiaen interprets as the interference of our inner-processes with external stimuli. "Duration presents itself to us with fluctuations of tempo, changes of rapidity: it is . . . heterogeneous duration, of which appreciation depends essentially on the number of exterior and interior events. . . . True time depends also on biological time. The rhythms of our organic life . . . influence our sense of duration. Finally, our appreciation of duration depends essentially upon the number of physiological events that are desired and executed by us (actions), and the exterior events acting on us (shocks)."[19]

The dichotomy between measured and unmeasured time Messiaen expresses through the opposition of "striated time" (*temps strié*) and "smooth time" (*temps lisse*). The first is the time measured by regular or irregular pulsations, the second is unmeasured or *measured by seconds*. He proposes using combinations of both in succession or superposition, but when using this combination a composer must "avoid at all costs" giving a similar unit or value to both these times, and also "not forget constantly using accelerando

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[16] Melody Baggech. *An English Translation of Olivier Messiaen's Traité de Rythme, de Couleur, et d'Ornithologie Volume I*. The University of Oklahoma, 1998, 18

[17] Ibid., 50

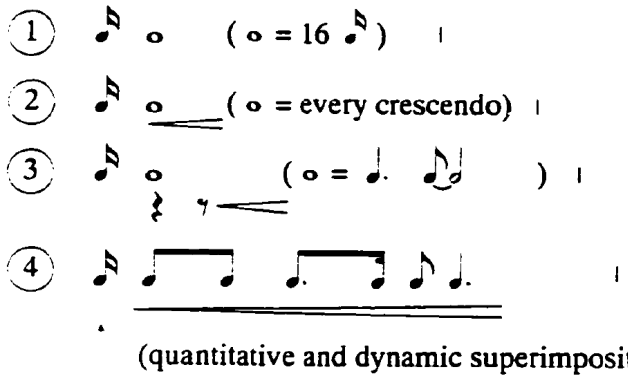
[18] Ibid., 49–50

[19] Ibid., 18–19

and rallentando to amplify" the effect of such a combination.[20] Thus created Messiaen's interpretation of heterogeneity, which for him is one of the main qualities of time. Heterogeneity of rhythms he calls "heterochrony" (*hétérochronie)* and the combination of *temps strié* and *temps lisse* can be one of the examples of it. But more generally, it can be any combination of rhythms.[21]

A qualitative aspect of duration is equally important for Messiaen, and this quality is also heterogeneous, one example of which could be "heterodynamy" (*hétérodynamie*)—a superposition of different dynamics. Combining it with the former would result in "heterocronodynamy" (*hétérochronodynamie*)[22]. In the first volume, he gives an example of such a superimposition combined with the usage of extremely long and short durations to further complicate "duration's numeric evaluation."[23]

Examples:



(quantitative and dynamic superimposition)

In the end, we can summarize Messiaen's idea of *durée vécue* in three main points: it is heterogeneous and ever-changing (so a composer should avoid exact repetitions), it is based on the human experience of their own and environmental rhythms (so a composer should pay close attention to those and find inspiration in them) and it is qualitative, hence immeasurable (so a written rhythm should not be easily measured by a listener using their habitual apparatus of division and multiplication).

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[20] Messiaen, *Traité de Rythme, de Couleur, et d'ornithologie*. Tome III, 352

[21] Ibid., 354

[22] Ibid.

[23] Baggech. *An English Translation of Olivier Messiaen's Traité de Rythme, de Couleur, et d'Ornithologie Volume I*, 44

Messiaen indeed offers us a beautiful theory. One can see how it is inspired by Bergson, yet it is highly original in its attempt to embrace the idea of duration from a musical perspective. However, he seems to be interested much more in things that "work" than the ones that do not. He provides almost a "recipe book" explaining how to get the right experience of pure duration, but its intangibility, which is its main quality, escapes his attention.

For Bergson, the only way to understand duration is intuition. One cannot understand it through analysis, but only through immediate experience, by completely immersing oneself in it.[24] Maybe this is why, despite duration being one of the main subjects of his philosophical research, he never gives —unlike Messiaen—its complete definition.

Feeling and not understanding

An example of a completely different approach from that of Messiaen, and probably even more radical than that of Bergson, would be the poetics of Russian poet Alexander Vvedensky, co-founder and one of the main figures of OBERIU group of poets in late 1920s and 1930s. For him, time was the essence of all things, yet, he rejected the idea of even trying to understand it.

At first sight, Vvedensky's take on time is very close to that of Bergson[25] and Messiaen. Time for him is both qualitative as well as immeasurable: "One can't compare three months gone by with three newly grown trees. The trees are present, their leaves glimmer dimly. Of month one cannot say the same with confidence. . . . If we were to erase the numbers from a clock, if we were to forget its false names, maybe then time would want to show its quiet torso, to appear to us in its full glory."[26] Yet, unlike Messiaen, he does not think that any experience can help us understand time, and argues for the contrary: any extreme experience of time would only set us further from understanding it. Moreover, it seems like Bergson's intuitive pondering of time does not satisfy him either: for Vvedensky, everything that can be said about time is untrue, thus the only way to understand time is to *not* under-

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[24] Bergson, *The Creative Mind*, 186

[25] Vvedensky does not mention Bergson anywhere, but we have enough evidence of interest to the philosopher's ideas among his closest intellectual surrounding to assume that he was at least familiar with them. See Tatyana Rezvikh. "Alexander Vvedensky's Antinomy of Time." *Logos,* no. 3 [99] (2014), 67–94 (in Russian, abstract in English)

[26] Vvedensky, *The Grey Notebook*, 11

stand it, and through not understanding time one can approach not understanding other things.[27]

His poetry is full of instances of not understanding time, and it is always situations of crisis, of catastrophe—death, execution, or prison—leaving his lyrical hero (or himself—sometimes it is impossible to draw a line) bereft of any knowledge, understanding, expectation, making them reinvent their relation to reality and existence. "I felt and for the first time did not understand time in prison. I always thought that at least five days ahead is the same as about five days back. It's like a room in which you stand in the middle, where a dog is looking into your window. You wanted to turn around and saw a door, but no—you saw a window. But if in a room there are four smooth walls, then the most you will see is death on one of the walls."[28]

Death is especially important in the poet's perception of time. Contrary to Bergson, Vvedensky does not reject the idea of measurable time completely, but for him, only that which has a beginning and an end can be measured. Death is the final measure of time, and time begins with the ultimate realization of the inevitability of death, namely when one knows for sure when death comes. Thus, one only has a second—maybe a minute or an hour—of time: "The last hour or two before death can really be called an hour. It is something whole, something stopped, it is like space, like a world, a room or a garden, which has escaped time. They can be touched. Suicides and murdered ones, did you have a second and not an hour? Yes, a second, maybe two, maybe three, but not an hour, they say. But were they dense and unfaltering? Yes, yes."[29]

Accepting death as a real measure of time, Vvedensky creates an antinomy: time is immeasurable, yet death—and death only—measures it. By measuring time, thus setting its starting point as well as its end, death erases memory—the only force that links the past with the future—hence disrupting the flow of time: time stops. Perhaps it is this antinomy of time which is both immeasurable and measured, flowing and still, is what Vvedensky calls "shimmering."

> Let the mouse run over the stone. Count only its every step. Only forget the word every, only forget the word step. Then each step will seem a new movement. Then, since your ability to perceive a series of movements as something whole has rightfully disappeared, that which you wrongly called a step (you had confused movement and time with space, you falsely transposed one over the

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[27] Ibid., 9

[28] Ibid., 15

[29] Ibid., 12

> other), that movement will begin to break apart, it will approach zero. The shimmering will begin. The mouse will start to shimmer. Look around you: the world is shimmering (like a mouse).[30]

This latest example immediately reminds us of Zeno of Elea, a great poet of antinomies of Ancient Greece, who had brilliantly not understood both time and space. Of all his famous paradoxes, the one which is still the most puzzling is probably the paradox of the flying arrow. His arrow is flying in time composed of "nows," and in each of these "nows," it appears to have occupied the same space. What occupies the same space does not move, therefore the flying arrow is at rest. From a common-sense point of view, one could argue that time simply is not composed of "nows" and there are the past and the future. But it is memory that allows us to think so, it is memory that creates a link between them. If the arrow were bereft of memory, if it were to forget its every step, then shimmering would begin. The arrow would shimmer (like a mouse).

In this chapter, I tried to demonstrate that "real" time, described as Bergson's duration or in any other way, is of fundamentally intuitive nature. But intuitive pondering of it could not be simply meditative since our inertia of understanding time through measurement is too strong. I assume that one possibility of approaching this intuitive experience of time would be through challenging this understanding, and there are many ways of doing that. Some of them would be the extreme experiences exemplified by poems of Vvedensky, demonstrating the absurdity of this understanding through Zeno's logical paradoxes, or numerous musical strategies, some of which I regard in the following chapters.

[30] Ibid., 11–12

Lost in translation

In the following two chapters, I discuss some possible musical strategies of not understanding time. In this one, I regard two examples of possible musical expression of Bergson's idea of duration in works of Kirill Shirokov and John Cage.

When we are trying to conceive of a possible musical situation of not understanding time, it is important to realize that *understanding* time is the very essence of musicianship in its traditional form: composers are constantly trying to invent successful time-measurement systems or use already existing ones in an efficient way, performers are practicing to master these systems to be as rhythmically precise as possible, and audiences are training to understand, interpret and evaluate these systems. So, it is possible to argue that any compositional strategy that, at its basis, challenges the value of understanding time, and this understanding itself, can already be a step towards a successful not understanding. There can be an infinite amount of strategies we could conceive of and a plethora of already existing examples. Nobody could claim to have invented the only possible one, neither exhaust the list of possibilities because both of these claims would be self-refuting. So I am going to arbitrarily focus on two possible strategies: a musical exploration of pure duration in its *intuitive* form and challenging the concept of simultaneity. Examples of the first one will constitute the next section of this chapter and the second will be explained in the following one.

Since the understanding of time and its measurement are the basic conditions for organizing situations of musical dialogue in forms known to us, it is important to understand that challenging them would mean destroying this organization, thus subjecting all its participants to extreme precarity. Yet, the social necessity of dialogue implied by the frame of the musical situation itself (as well as human desire to leave the precarious state) will make them invent new forms of this dialogue—the ones not built upon the understanding of time.

Going backward

Both examples I want to explore in this section, at first sight, take a very similar approach to duration, which is simply taking one step backward in translation: from the time measured by clocks to continuous motion. Yet, having taken very different turns on their way, they end up with very different results.

The first example is Kirill Shirokov's *Two pieces for one performer with three hourglasses* (2013). Both pieces have the same setting and the same principle of translating the time measured by stopwatch to operations with hourglasses: the performer has to measure the exact duration of each hourglass and

create their own timetable prescribing the moments of turning the hourglasses according to the score.

These pieces offer a radical and extreme rethinking of a dialogue between a performer and audience: normally, an audience is provided with some kind of rhythmical language they can interpret based on their listening experience, which allows them to form certain expectations towards what kind of temporal organization they are faced with. Here, they are deprived of any clue of that sort: there is no uniform division of time both in the sense of everyday (clock) and musical time (beats), neither there is any succession of sound, which usually helps in forming temporal expectations as well.

Kirill Shirokov. First piece for one performer with three hourglasses.

Kirill Shirokov. Second piece for one performer with three hourglasses.

So, the audience has to reinvent their expectations toward time and get used to a new kind of organization of the dialogue between them and a performer on stage. And, what I find especially beautiful about these pieces, is that they are happy to help us make sense of this new type of situation, for they both have extremely clear combinatorial structures which, once understood, become very predictable, hence comforting.

These pieces offer the audience a journey—or, in Bergson's terms, it induces a succession of conscious states: faced with something completely new and unknown, we proceed to gradually form a new way of feeling the time based on motion rather than clear division. Interestingly, this experience is one-sided: the performer does not participate in this journey, they act in the same way most of the musicians usually do, performing a set of prescribed actions based on a clear temporal matrix. Moreover, since the performer is the only one given the knowledge of clock-time, thus measuring the durations perceived by everybody else, they act as a singular temporal authority for the audience's perception.

Another example is John Cage's *Concert for Piano and Orchestra* (1957–58).[31] Here we have a similar way of translating the clock-time into motion. The conductor has a stopwatch and translates the movement of the clock hands into their own movements. All musicians divide their parts into sec-

[31] An incredibly comprehensive research on this piece is currently lead by Philip Thomas at the Universities of Huddersfield and Leeds. The information about it can be found on their website: https://cageconcert.org/

tions and decide on the length of their sections themselves, based on the overall duration of the performance. During the performance, if the conductor is present (a performance may or may not include any of the parts, and this applies to the conductor as well), the musicians follow the conductor's hands instead of clocks.

However, the conductor's role is not simply replacing the clocks with their hands, but translating the clock-time into what Cage calls "effective time," meaning that the latter might not be the same as the former. The conductor's part consists of a table of "clock-times" corresponding to "effective times," prescribing what time the conductor should show with which speed based on the stopwatch. For example, they can show 15" of "effective time" in 1'30" of "clock-time," then 1'30" in 1'30", then 1'15" in 2'00" and so on. Even though the order of these changes is fixed, the conductor may decide where to begin, meaning that the orchestra players do not exactly know when they can expect the time to speed up and when to slow down. The changes of the speed of the time flow interfere with the density of musicians' parts, disrupting their expectations: e.g., one could be going to play quite a bit of material in 1'30", but might have to "squeeze" everything in 15".

This is a good example of a "failing hierarchy," when musicians, relying on the conductor as the only temporal authority, find themselves in a situation of extreme uncertainty, and this uncertainty becomes one of the main characteristics of the piece communicated to the audience. So the audience's experience of duration is based on empathy, on their connection to the musicians' stress, and musicians' precarity evokes a succession of responses in the audience's minds.

These two examples show musical situations in which our usual understanding of time through measurement is challenged, putting audience or musicians in a precarious state, which gives rise to a possibility of new experiences of time. In the case of Shirokov's pieces, it is done by taking away the means of measuring, in the case of Cage's Concert, by making these means unusable.

Another strategy would be challenging the concept of simultaneity, for measurement is essentially what makes simultaneous actions possible. I will discuss this in the next chapter.

How to be late

In this chapter, I talk about simultaneity, which plays a significant role in our usual musical interactions. I regard different kinds of simultaneity (contemporaneity and instantaneity) and the dual nature of simultaneity and succession in their interdependency (mainly, how memory, tracing change, makes possible expectation and evaluation of simultaneity). Later, I touch upon different ways of transforming one into another. In the last section, I talk about the coronavirus crisis of 2020 during which this paper was written and its effect on my work: in the lack of possibilities of physical performance of my pieces, I became interested in networked music performance, which operates in a very different temporality from the one familiar from chamber music, in particular, because of altering latency being one of its main qualities.

Simultaneity and succession: duality

Dialogical music-making depends heavily on simultaneity. Being able to play at the same time is vital to our sense of togetherness, and it is what constitutes our collective understanding of time.

To conceive of simultaneity, we usually imagine two actions happening instantaneously, meaning that the interval between them is too minuscule for us to process. For instance, we can spot simultaneity when two (or more) movements reach their extreme states at the same instant, but to notice these movements and the difference between an instant of them resulting in the simultaneity and any other, we need memory, hence, succession. Thomas Aquinas says that the complete simultaneity—the one which completely excludes succession—can only exist outside time, in the divine domain of eternity.[32]

For Bergson, this idea of simultaneity depends on the translation of time into space, thus the idea of an instant is similar to a point on a line. This understanding of simultaneity he calls "simultaneity of an instant" or "instantaneity," which is opposed to the "real" simultaneity—"simultaneity of the flow" or "contemporaneity," based on the idea of duration as a conscious state. Bergson calls two flows simultaneous when they depend on the duration of the third—our attention to them.[33] Thus, the "real" simultaneity cannot be described through a point, it always is a mental act that lasts.

Yet, Bergson admits that the idea of an instant is culturally embedded in our understanding of time "as soon as we acquire a habit of converting time

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[32] Thomas Aquinas. *The Summa Theologica*. Part I. London: Burns Oates & Washbourne Ltd., 1920, 103

[33] Bergson, *Duration and Simultaneity*, 52

into space."[34] Understanding an instant as a point on a line is so habitual to us that we seldom think of the absurdity of this proposition. The Time Traveller from Herbert Wells's "Time Machine" rhetorically asks: "Can an *instantaneous* cube exist? . . . Can a cube that does not last for any time at all, have a real existence?"[35] Therefore, for the idea of an instant to exist in time, this point does have to have a dimension, it has to last a duration, even when it's so short that we cannot feel it. "Spatialized time, which admits of points, ricochets onto real time and there gives rise to the instant."[36] Instantaneity, thus understood, even though is derived from the conversion of time into space, needs duration to be felt. It is a sort of *mediated* feeling of simultaneity that we need to acquire to synchronize our inner-feeling of time with the time of extraneous events.[37]

In terms of musical interaction, these two types of simultaneities can be described as the simultaneities based on shared measure and shared feeling. Shared measure is known to us from the understanding of time of western professional music that demands an instantaneity of action, and it usually requires some kind of temporal authority. Shared feeling is known from certain practices of free improvisation, but also employed by some composers. But, of course, just as simultaneity of an instant cannot exist without simultaneous flows, musicians usually need to acquire some kind of mutual feeling of the flow to share the same measure, so usually, we experience a mix of both,[38] while focusing more on one or another.

In Morton Feldman's *Durations* (1960–61), a series of pieces for different ensembles, all musicians read from the same score, but, having started together, they decide on the duration of each note for themselves, thus they are not required to play the chords instantaneously even though in the score they are vertically aligned. Yet, Feldman expects "no instrument to be too far behind or too far ahead of the other,"[39] hence attentive listening to each other and some sort of shared feeling of time is required to play the piece.

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[34] Ibid., 53

[35] Herbert George Wells. *The Time Machine*. London: Penguin Books, 1903, 8

[36] Bergson, *Duration and Simultaneity*, 53

[37] Ibid., 54

[38] Especially in composed music, however "unmeasured" it might be, I would argue that the existence of a score in itself is an act of measurement. The differences arise, of course, depending on where does one go from it.

[39] Morton Feldman. "Liner Notes." In *Give My Regards to Eighth Street: Collected Writings of Morton Feldman*, edited by B. H. Friedmann. Exact Change, 2000, 7

Manfred Werder's *2003–2004* series of pieces mostly consist of stillness,[40] having only up to three sounds in each piece. The duration of each piece is never predetermined, meaning that musicians have to agree on it themselves. However, they are not allowed to use clocks, so this duration cannot be determined by them in advance, but the decision to end the piece comes naturally during the performance. More than a half (4 out of 7) of these pieces have a fixed number of sounds that have to be performed, so the duration can vaguely be determined by the exhaustion of every possibility to make a sound, but in the last three pieces the number of sounds can vary from one performance to another (it is always two or three), hence the duration of each of these pieces must be determined independently from the number of events within it. But even in the first four pieces, the end of a performance is usually separated from the last sound by a rather long time of stillness. How do musicians decide when to stop playing? Of course, they can use some visual signs like eye contact, nods, etc., but I was always wondering whether they could do that without any signs, just by intuition, with a shared feeling of duration.

A similar sensation of mutual duration of stillness I experienced several times during our improvisations within the "DæKa" trio (me, Darya Zvezdina and Kirill Shirokov). In our improvisations, we frequently had periods of stillness, interrupted only by the will of one of us to produce a new sound. But sometimes there were moments during some of those stillnesses when I clearly felt that nobody is going to play anymore, and usually, I was not wrong. It was not a limitation set by concert producers, but rather some kind of exhaustion that we all felt at the same time. However, it was not exhaustion of the material—maybe exhaustion of stillness? It may be argued that these experiences may be mere accidents or false memories, but I still believe that this mutual feeling of exhaustion can be communicated: neither visually nor aurally, but somehow else.

These three ways of feeling simultaneity in music—aural, visual, and the one I, for want of a better description, call "the exhaustion of stillness"—all depend on a feeling of succession. They all follow certain successions that create some kind of expectations: in case of listening it is a succession of sounds, either regular (clicks of a metronome) or irregular (the events in Feldman's *Durations*), in case of visual perception it might be a motion that we expect to culminate at a certain point (conductor's upbeat, soloist's nod),

[40] By "stillness" I mean lack of noticeable physical action. I use it in opposition with sound because making sounds is the only action that can possible serve as a tangible time measure in these pieces.

in case of "exhaustion of stillness"—well, this exhaustion, for "time . . . not only measures movement but it also measures repose."[41]

Simultaneity and succession: transformation

At the heart of our perception of simultaneity is latency—the interval between sending and receiving (processing) any information. Any sound needs time to get from a body that creates it to us, but we also need some time to process it. There is a limit to physiological capacity to perceive duration, which is around 2–5 ms,[42] meaning that, when we perceive a succession of sounds within a duration less than this, we perceive it as simultaneity. This effect is noticeable when we play a slowly accelerating pulse: after a certain threshold, we start perceiving it as pitch. It also works backward: a progression of sounds, played fast, can be perceived as simultaneity, but we start hearing it as a succession when it slows down. This effect is beautifully presented in Joseph Kudirka's *Music Boxes* (2014–2015). Each of his music boxes plays a short tune in an infinite loop, slowing down very gradually during the performance. The slower it gets, the more apparent the transformation of simultaneous events into successions becomes.[43] This slowing down, transforming simultaneity into succession, Bergson interpreted as an inherent quality of time: "time is what hinders everything from being given at once. It retards, or rather it is retardation."[44]

However, when it comes to playing music, our reaction latency, which is much higher than the latency of sound propagation in air, is also at play. Our "reaction time . . . is on the order of hundreds of milliseconds and quite variable,"[45] and, even though hundreds of milliseconds of latency are still not too much for speech communication, musical interaction requires a much faster reaction. This reaction latency can be reduced using a succession of movements or sounds that create anticipation (common feeling).[46]

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[41] Aquinas, *The Summa Theologica*, 104–105

[42] Alessandra Gianella Samelli, Eliane Schochat. "The Gaps-in-Noise Test: Gap Detection Thresholds in Normal-Hearing Young Adults." *International Journal of Audiology* 47, no. 5: 238–245.

[43] https://soundcloud.com/joseph-kudirka/sets/music-boxes

[44] Bergson, *The Creative Mind*, 109

[45] Chris Chafe. "Living with Net Lag." *AES 43rd International Conference*, 2011, 4

[46] Chris Chafe et al. "Effect of Temporal Separation on Synchronization in Rhythmic Performance." *Perception* 39 (2010), 982

In a small enough space, compensation for reaction time can allow us to perform actions instantaneously, meaning that they fall under the threshold of <5 ms. But we can ignore latencies higher than that if we are accustomed to certain traditions of music-making. For instance, in a commonly spaced small chamber ensemble, sound can take up to 9 ms[47] to go from one player to another and even more in orchestras. We can learn to compensate for latencies even higher than our reaction time if this latency is easily calculable and other ways of synchronization (e.g. visual) are available. For instance, it is known that in large orchestras percussionists learn to play a bit earlier than the rest of the orchestra because it takes a longer time for their sound to reach the audience.

I would assume that to lose our usual perception of time, to "feel and not understand" it, we can put ourselves in situations where simultaneity is impossible. This can be done by disrupting the visual and aural mechanisms of anticipation and evaluation, e.g. when musicians cannot see each other, when the latency is increased and incalculable, or when they simply are not in the same room.

Different place, different time

The current COVID-19 crisis and the self-isolation induced by it sets us many challenges that we are still to reflect upon. As any major crisis, it destroys our usual worldview, making us rethink many aspects of our lives. It is already transforming our social, economic, and political reality in many aspects, revealing people's extreme precarity and interdependency, teaching us the necessity of sympathy and collaboration.

As for musicians, we are noticing major changes in our perception of time. The need for social distancing inevitably leads to desynchronization on many levels, transforming many simultaneous processes that we are used to into successions, thus slowing down our interactions significantly.

Dialogical music-making is among those practices that undergo the most drastic change. In the absence of the opportunity to play music together in the same room, many musicians turn to networked music performance as an alternative. We are witnessing an unprecedented growth of all forms of online music-making from one-on-one lessons and streamed solo performances to live ensemble concerts. Telematic performances, usually reserved for devoted explorers and technology aficionados, now become widely accepted: by some as an unpleasant, but necessary measure, by some—as a field of previously unseen possibilities.

Networked music performance is too vast of a field to exhaustively explore in this paper, but a brief introduction to it is necessary for two reasons:

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[47] Ibid., 982–983

it is a medium that inherently disrupts our perception of simultaneity and one of the pieces I will analyze in the next chapter was written to be performed over the internet.

Networked music performance imposes a set of particular technological constraints that vastly affect the quality of musicians' interaction. Rebekah Wilson, a composer who runs continuous and extensive research into networked performance, exploring both technical and aesthetic approaches to it, highlights altering latency and uncertainty among primary characteristics of this medium.[48] Latency is an inherent quality of the internet. Even though the internet communication is light-speed, "the speed of light in fiber is roughly 2/3rd the speed of light in air,"[49] and it is always changing because of the architecture of the protocol: when data are transmitted over the internet they are divided in packets of the same size and each packet takes a different route to the destination point. Because of that, the performers, when located in different places also exist on "multiple temporal planes,"[50] so their communication is fundamentally horizontal, and there is no singular temporal authority to refer to.

Of course, these qualities make traditional music performance virtually impossible, but Wilson argues that overcoming these challenges would allow us to invent new ways of playing music embracing latency. Among possible creative approaches, she mentions "post-vertical harmony" based on allowing harmony to be transformed unpredictably by latency[51] and new ways of exchanging the vital information for performative relationships in situations of mediated presence.[52]

My interest in networked music performance started just two weeks before the pandemic came to the Netherlands, during a workshop Rebekah was running at the Conservatoire, and it naturally resulted in organizing the Spring Festival Online a month later. The annual Spring Festival is built mainly around pieces by the students of the Conservatoire's Composition

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[48] Rebekah Wilson. *The Constraints, Aesthetic Implications, and Creative Strategies of Composing for Networked Music Performance*. Victoria University of Wellington, 2018, 19

[49] Ankit Singla et al. "The Internet at the Speed of Light." *HotNets-XIII: Proceedings of the 13th ACM Workshop on Hot Topics in Networks* (2014): 1–7

[50] Wilson, *The Constraints, Aesthetic Implications, and Creative Strategies of Composing for Networked Music Performance*, 19

[51] Ibid., 13

[52] Ibid., 16

Department, and it got canceled because of the crisis. I adapted one of my pieces for our online edition of it, and its analysis is given in the next chapter among other pieces of the series. General reflections on organizing this event, written in collaboration with other organizers, as well as the technical details, are present in the Appendix.

Wilson argues that the wide availability of technology, together with the invention of new forms of music-making that are tailored to its constraints, can lead to our adaptation to much higher latencies than before, allowing us to become "latency-native."[53] I would assume that becoming latency-native would mean abandoning our current understanding of musical time, proving the first sentence of this chapter (that dialogical music-making depends on simultaneity) wrong, and it would lead to completely new kinds of horizontal organization of ensembles.

[53] Rebekah Wilson. "Becoming Latency-Native." *Web Audio Conference WAC-2019*: 168–169.

Many songs

> Alice laughed. "There's no use trying." she said: "one *can't* believe impossible things."
> "I dare say you haven't had much practice," said the Queen. "When I was your age, I always did it for half an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."[54]

Since September 2019 I have been working on a series of pieces in which I am trying to come up with different ways of creating confusing experiences of time. To achieve that, I employ two main strategies: one is making instantaneity between musicians impossible, another is building failing hierarchies of temporal authorities.

While my scores demand certain events to be performed instantaneously, I create three levels of disruption of expectation: the first two are the scores themselves and the media I employ as temporal authorities. Since the score has no measure and the duration of each note is vaguely determined by its distance to the following one, the musicians cannot rely on their listening to be "in-time" with each other. This level can be easily managed with the musicians' visual interaction. This is when the second level comes—the unreliable temporal authority. At the time of writing, I have used three media for that: music box(es), self-playing instruments[55], and the internet. A music box, even when a human plays it, has all the sounds written on the roll already, and it is impossible to see what sounds come out of it immediately after the turn of the lever, so there is no immediate connection between the performer's action and the sound they produce, hence it is useless to try to establish any kind of visual interaction with them. With the self-playing instruments the visual interaction is impossible for obvious reasons, and the internet does not only limit the possibility of visual interaction, but the effectivity of such interaction is vastly decreased by the connection latency.

Yet, in the case of music boxes, the second level of disruption of expectation can still be managed with adjusting to the music box players' movement—the cycle of rotating the lever. And that is when the third level is needed. When the speed of this rotation slows down, the singular movement starts to stutter, resulting in losing control over its speed. The music boxes

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[54] Lewis Carroll. *Through the Looking-Glass*. J. M. Dent & Sons Ltd. London, 1949, 149

[55] By self-playing instruments I mean mechanical and electronic instruments that are more preprogrammed than controlled during a performance. In this chapter, the only example of such instruments is MIDI-organs in *Up to Fifteen Songs*, but in further development of the series I am planning to employ pianolas, turn-tables, and automatic music boxes.

thus become very unpredictable, and nobody knows for sure when the next sound is going to occur.

In this way, the musicians' expectations are consistently deceived, while the necessity of staying together remains. This puts them into a highly uncomfortable situation, requiring the invention of new ways of achieving simultaneity over and over again, and when the last "usual" means of doing so turns out to be useless as well, they are left only with their intuition.

In most of these pieces—except the one written to be played over the internet—I use 30-note chromatic music boxes with a hand-driven mechanism; the pitches and rhythm are written on a punched paper tape. There is a peculiar conflict between the certain rhythmical freedom provided by the paper tape and the necessary presence of a human turning the lever. The latter is never accurate enough compared to the intended rhythm and it always distorts whatever rhythmical precision is programmed by the tape. I highlight this quality in two ways: firstly, by asking music box players to play in tempo slow enough to never be able to maintain the constant speed of rotating the lever, and the slower the rotation, the more fragmented the movement becomes—the more hands "stutter;" secondly, one music box rarely plays alone, but usually in unison with other instruments. The attempt to play in unison distorted by the above-mentioned qualities of music boxes results in constant heterophony.

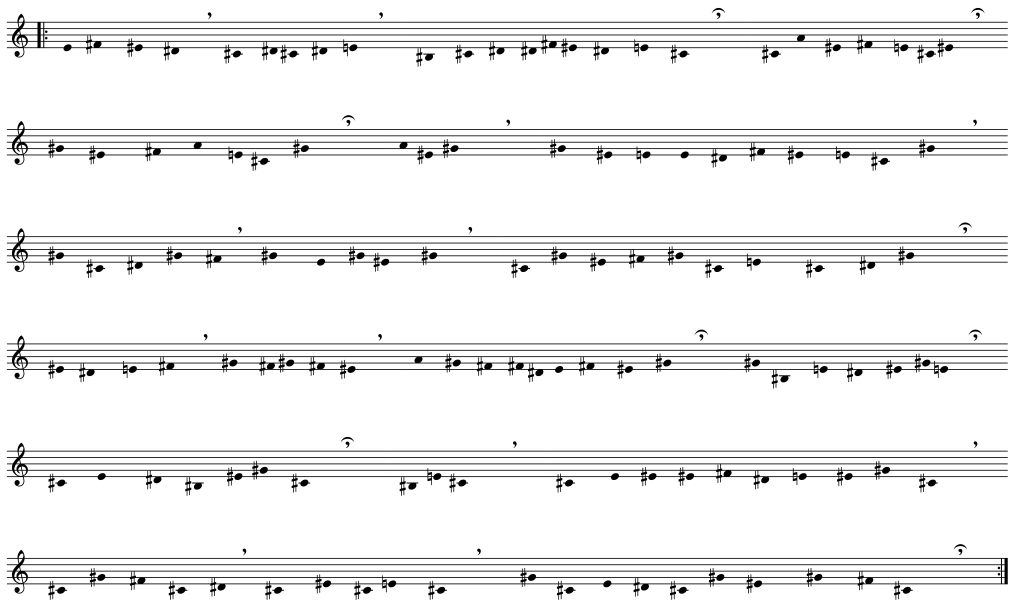
Shifts of temporal authority are possible because all musicians follow the same melody like an ideal timeline and, while required to play in unison, musicians (in some pieces all of them, in others only some) decide for themselves when to enter and leave it. Every time a musician enters or leaves the timeline their inner-time interferes with the time of others. It also demands a swift refocus of attention from the musicians that are already playing and results in changing the mode of their listening and performance: depending on the nature and moment of the change, each musician may have to reinterpret their role in an ensemble, e.g. switch from leading to following or vice versa.

The title of each piece is "*X* Songs" and is derived from the number of changes of modes of performer's listening in each piece, e.g. if there are three changes in a piece, it will be called *Four Songs*, where "songs" mean the times surrounding the changes.

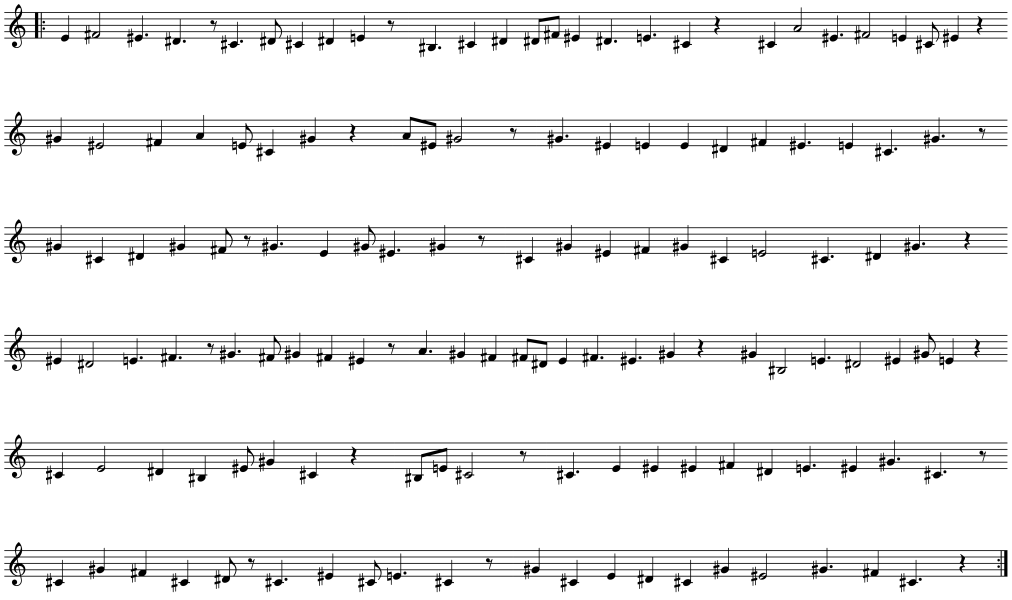
Two songs

This piece was written in September 2019 for Moscow Contemporary Music Ensemble. It was the first piece from the series and the starting point for the whole project.

The material of the songs is a plain melody, played in unison, and it can be repeated any number of times. There are two scores: one is for flute, clarinet, cello, and piano, written in unmeasured notation.



The other one is for the music box (ideally, not seen by the rest of the ensemble), written with exact durations.



The paper roll for the music box is folded and taped in a Möbius strip fashion, which results in the entire melody being inverted after going through the cycle in prime order. In the examples above: lines 1–3 are the melody in prime order and 4–6 are the inversion.

Each song represents a different kind of synchronization. The first one is played only by flute, clarinet, cello, and piano using their unmeasured score. They try to play together, but they don't have their usual tools (note values, time signatures, etc.) to assist them with that—only the distance between notes and shorter or longer rests. In this way, the score still has its absolute temporal authority as a spatial representation of events in time, but it cannot be reliable enough for musicians to trust it in guiding them, so they have to decide to shift the authority to somebody from the ensemble, i.e. the score ceases to be more important (at least in rhythmical dimension) than individual choices of musicians.

The second song starts when the music box comes into play. Since the paper roll in the music box is looped, the musician can start playing at any moment of the piece. The music box player decides when to start and doesn't tell the other musicians when it is going to happen. During the performance the music box player is offstage, and the sound is transmitted to the rest through headphones or a little monitor speaker, so they also cannot see when the music box player is about to start. What happens is a shift of temporal authority from someone from the ensemble to the music box. It changes the ensembles' organization: in the first song, musicians follow the score and just listen to each other, which makes it fairly easy to play together (although it is seldom really precise), but, when the music box starts playing along, it becomes a medium of synchronization—as a sort of metronome or conductor—because, even though it is played by a human (who also has the authority of knowing the precise rhythm), it can never be fully controlled, so it is something that everyone else has to follow. Since a person can never be as precise as a mechanism, the sense of time it creates is the opposite of unified, regular and predictable time of metronomes and conductors, which puts musicians in a situation of never knowing when the next event is going to happen but rather feeling the flux of time as something that can never be controlled. In that way, used as a medium to synchronize, the music box becomes the opposite of such a medium, making musicians overcome its instability while trying to play together.

The structure of the piece is fairly simple: just one melody, split into two halves by the entrance of the music box. The sound and the difference in heterophonic texture is rather predictable, but the possibility of the music box entering at any point makes this moment very intense: there are too many factors musicians have to keep in mind when this shift happens—it comes into direct conflict with their current expectations and the speed of their reaction. For instance, if the music box starts playing from the beginning of the phrase after a pause it would be much more comfortable for musicians than when it cuts through the middle of a phrase. Also, the music box can start playing "too soon" or "too late" in terms of musicians' expectations

about the overall duration of the piece. In the end, the result is quite different each time, so I would like to regard two different performances of this piece by the same musicians of the Moscow Contemporary Music Ensemble within three days.

The first performance took place on September 12 in the hall of Music School in Tchaikovsky City. What struck me there, is that the situation I imposed on musicians created not only the interaction I intended but also an unexpected sonic quality. First, they had to play extremely soft—as soft as I could never ask them to play. It happened not only because of their extreme attention to each other but also because they were afraid of missing the moment when the music box (which also sounded extremely soft from a tiny speaker on stage) comes in to play. This softness allowed flute, clarinet, and cello to completely blend, and also created some amusing artifacts: for instance, the pianist also tried to blend with other musicians and play as soft as them, and, for that reason, some notes were not fully pressed, hence were omitted; also the clarinet player played so softly that it was very hard for him to produce pitch (because the air pressure was never sufficient to make the reed vibrate properly), therefore all the sounds were covered with clarinet's air noise. At last, the asynchronicity of them never being able to arrive at a note simultaneously, combined with the dynamics and this specific blending, was sometimes perceived as a timbral quality more than temporal.

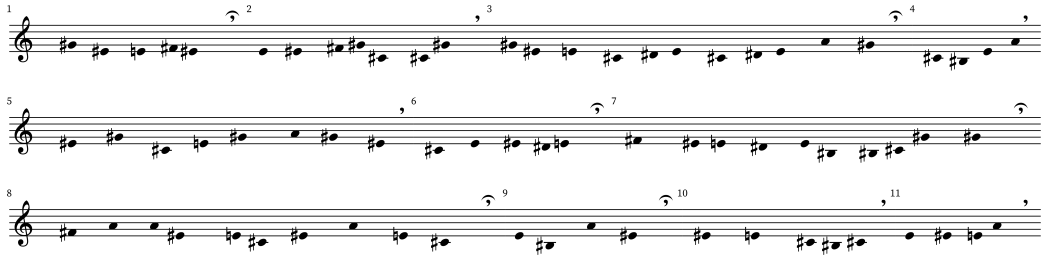
The second performance happened on September 14 at the Chamber Hall of Moscow Philharmonics. This time I wanted to have a slightly different version from what was two days ago, and asked the music box player to start playing somewhat later than last time, and sometimes take the music box a bit further away from the microphone, thus making the sound softer. That created an unexpectedly big tension during the performance: firstly, the music box player decided to enter during the second repetition of the melody, which has never happened before, so, even knowing that it is possible, musicians appeared confused by the music box not entering when they expected—they started playing even softer than before and much slower, being extremely careful not to miss the music box. But then, after the music box entered and everything went back to normal, this precarious feeling returned every time the player took the music box away from the microphone, creating the feeling of the whole ensemble repeatedly falling apart and getting together again.

Two more songs

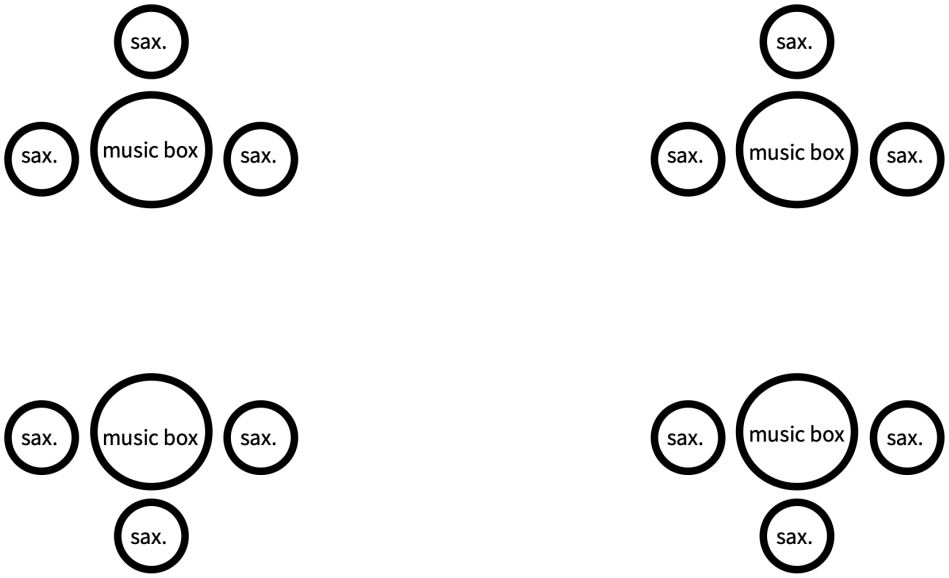
This piece was written for the Saxophone project at the Royal Conservatoire and it was supposed to be performed during the Spring Festival in April 2020, but the festival got canceled due to the COVID-19 pandemic. The instrumentation is 12 saxophones and 4 music boxes and the structure is very similar to

the first piece but in reverse. It starts with all musicians (saxophones and music boxes) playing a melody together in unison, but then at some point, the music boxes have to stop and the saxophones have to finish playing the piece by themselves. Like in the previous piece, the saxophones do not know when the music boxes are going to stop, so, when it happens, the saxophones find themselves in a very short moment of intense dialogue, trying to find a way to immediately reorganize themselves as an ensemble. A similar dialogue occurs between the music boxes. All of them decide separately on when to stop, but they all have to stop whenever the first one does, so this moment is also unexpected by three of them.

The melody is also different from the one in the previous piece. Since the saxophones need to play together until the end, it is a long continuous line instead of a short repeating one. Yet, the modality and character of the melody remain the same.



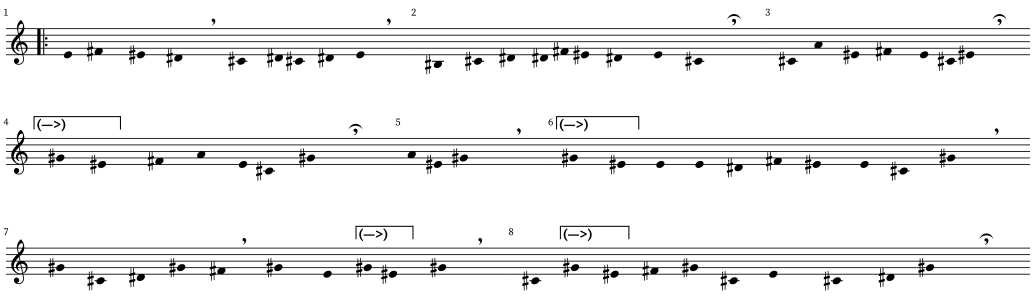
An additional challenge for the musicians' interaction is created by their positioning on the stage: the music boxes must be as far from each other as it is still possible for them to hear one another, and the saxophones split into four groups of three, each group located around one music box.



Four songs

This piece is written for an ensemble of six unspecified instruments and two music box players with two music boxes each. The performance was supposed to happen at the CASS concert in April 2020, which was also canceled due to the pandemic.

Structurally, this piece is a hybrid of *Two songs* and *Two more songs*: six instrumentalists start playing the repeating melody in unison, and at some point, the music boxes come in. Then, any one of the musicians from either ensemble or the music boxes can switch to playing the second—long—melody. Instrumentalists need to skip the remaining notes on the first page and go directly to the second, and the music box players must switch from one of their boxes to another. This can happen at one of the moments in the first melody indicated by arrows, which serve as a sort of "links" between the first and the second melody.



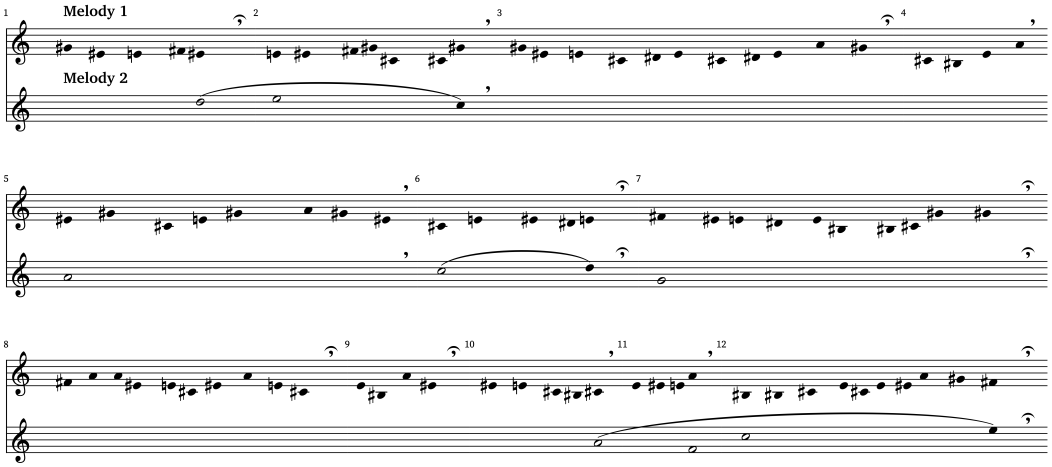
I find this moment interesting for three reasons: firstly, it is a change not only of the temporal organization of the ensemble, but a change of the material, which might be more tangible for the listeners, secondly, it creates not only the need for attentive listening among musicians, but also a special interaction between them and the score, meaning they have to "jump" from one part of the score to another, but most importantly, for a brief moment it potentially reverses the temporal authority from the music boxes to the ensemble, allowing one of the instrumentalists to control the music box players' actions. After this change happens, the rest of the piece continues as in *Two more songs*: after the music boxes stop playing, the instrumentalists need to finish the piece by themselves.

Up to fifteen songs

This piece was written especially to be performed in Orgelpark, a concert hall in Amsterdam that has multiple church organs, in February 2020. The instrumentation is four music boxes, Mustel harmonium with celesta manual, and two organs—Sauer and Utopa—controlled by MIDI. Unlike the other pieces which are based on one melody in unison, this one has two simulta-

neous melodies. The instruments are divided into two groups: two music boxes, celesta, and the Sauer organ play *melody 1* and the other two music boxes, harmonium and the Utopa organ play *melody 2*.

Melody 1 is faster and resembles melodies from the other pieces of the series. *Melody 2* is slower and complements the first one: when superimposed, all the notes in *melody 2* coincide either with the first or the last note (or both, or neither) in a phrase in *melody 1*. The unmeasured notation is used for everybody playing this piece, music boxes included.



There are more changes in this piece than in others because every instrument starts and stops playing at arbitrarily chosen points, so the overall structure is much more complex as well. Everybody can only play once during the piece and must not tell others when it is going to happen. This rule was derived from the construction of the music boxes (it cannot stop playing at some point and start again later, because no part of the roll can be omitted) and applied to all the other instruments.

This rule has a substantial role in the structure of the piece and the musicians' dialogue while playing it. Since any combination of the instruments can occur at any moment, it results in the creation of a particular hierarchy of temporal authorities, based on rhythmical flexibility and predictability of the instruments:

1. celesta and harmonium (one player): the most flexible instrument, meaning that the player can easily follow whoever plays in unison with them and the construction of the instrument allows any divergence from the score—thus the least temporal authority.
2. music boxes: players can vary the speed rather freely, but the rolls move only in one direction, making them less flexible, and all the notes are already written on the rolls, making them more predictable, hence more temporally authoritative than celesta and harmonium.

3. MIDI-organs: the score is translated into a rigid succession of midi-events, making them the least flexible and the most predictable, thus giving them the most temporal authority.

But then the material of the piece, given that *melody 2* is complementary towards *melody 1*, in certain combinations can reverse the hierarchy set by the construction of the instruments. For instance, if celesta plays *melody 1* simultaneously with (one of the) music boxes playing *melody 2*, the music box player(s) are more likely to follow the speed of the celesta player, making celesta more temporally authoritative. Or, when the music box player(s) play *melody 2* together with harmonium, based on the fragmentary character of the melody itself, none of them has prevalence over another, meaning none of them can be authoritative. So, the material affects the temporal authority of instruments almost to the same degree as their construction.

Besides that, I make a "loop" in the hierarchy by placing a pressure sensor on the pedal of the harmonium, which measures the frequency of the player's pedaling and uses these values to change the tempo of the MIDI-file played through the two organs. When the harmonium is playing together with one (or both) of the organs, they become much less predictable but remain completely inflexible, meaning that, while they maintain their temporal authority, it cannot be trusted anymore. The table below demonstrates this hierarchy by placing all the instruments in the order of succession of levels of their temporal authority.

Level of TA	Instrument	Melody
I	Harmonium	2
I	Two music boxes	2
II	Celesta	1
III	Two music boxes	1
IV	Utopa	2
V	Sauer	1

This hierarchy, together with an assumption that all the musicians choose to start and stop playing at different points, creates a series of switches of attention from one center to another, providing several shifts of temporal authority between instruments. The overall number of these switches depends on whether all the starting and stopping points happen independently or some of them can be simultaneous. Two extremes are possible:

1. If all the players decide to start and stop at the same two points, there will be no switches at all, hence there will be only one "song."

2. If no points ever coincide, it potentially can (given that the temporal authority shifts with the entering of every new instrument, which also depends on their order) result in sixteen switches and fifteen "songs."

Since any instrument can start and stop playing at any two points, it is possible that at some moment silence can occur, e.g. if some instruments have already finished playing but some have not yet started. If that happens, those who have not started need to imagine the melody line to keep going until they embark on it. In that way, only their imagination and memory have any temporal authority over them.

Four more songs

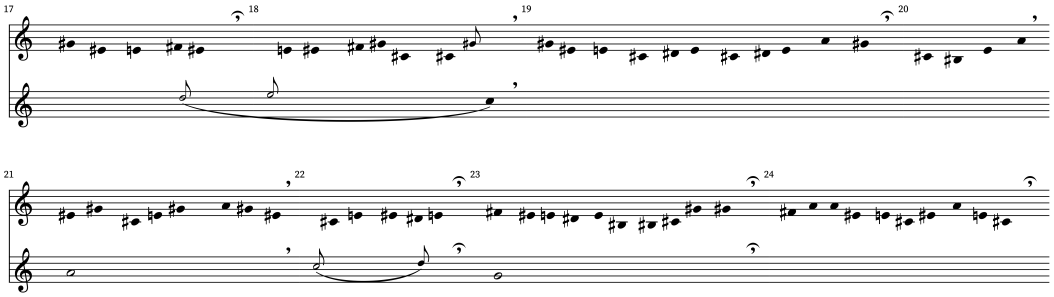
This piece was written in April 2020. The instrumentation is free, but it requires at least three people. The first performance happened at the Spring Festival Online, and there were six instruments: flute, trumpet, concertina, accordion, violin, and viola. The main difference between this piece and the others in the series is that it does not use any music boxes. I use music boxes mainly to disturb the rhythmical precision and make simultaneity impossible, and these are the same qualities network latency has. However, music boxes in my pieces start and stop playing at certain points, but latency is an inherent quality of the internet that cannot be switched on and off, so I needed to find another way to build dramaturgy in the piece.

Source-Connect Now, a piece of software developed by Rebekah Wilson, is necessary for the performance of this piece. It allows playing music together over the internet with very high sound quality. Its main difference from many other programs is that it uses the peer-to-peer connection, meaning that each performer sends a copy of their input signal separately to every other. It results, as opposed to the server-client model used in most other programs, in every performer having a somewhat different temporal image than every other.

This quality of connection alone changes musicians' interaction so much that I felt like there was not much left to do for me as a composer, so I decided to merely highlight it with the material of the piece. I focused on two main aspects of it: altering latency that constantly transforms simultaneity into succession, and different temporal planes in which musicians exist, making them perceive this succession differently.

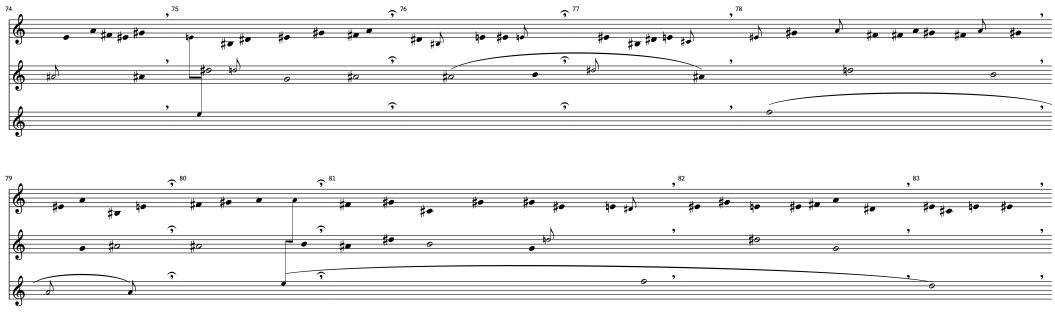
The first two songs use materials from *Four songs* and *Up to fifteen songs* respectively: at the moment when the change from the first to the second song happens, musicians have to split in two voices. Starting from the second performance, made with Russian musicians for the New Acousmatic project, I slightly changed the material of the first song by borrowing from *Two more songs*, meaning that when the second song starts with the entrance of the second voice, the material of the first voice remains the same.

Starting from the third, the material grows in complexity. In the third song, the two-voiced melody from the previous one is written with occasional grace notes. Before, the events that coincide in both voices were meant to be played simultaneously, but this simultaneity resulted in succession because of the latency. Now, this succession is fixed in the score and the notes have to be played in strict order.



However, since every musician hears the rhythm somewhat differently from others, it results in a serious complexification of heterophony. For instance, if group A plays a grace note, it means that group B can only play after it. But, while some musicians from group B can already have heard the grace note and played their own, some others are still waiting. This leads to serious confusion, but also immensely intensifies performers' attention to each other.

The last song creates another level of complexity with the addition of the third voice. Now, the musicians have to split in three, sometimes having to play successions of three events: two grace notes and a normal one.



Like in all the pieces from the series, I wanted to make all the changes from song to song sudden, creating the necessity for performers' swift reorganization. In the case of this piece, I decided to create these changes on the level of the score, so the score itself would change while they play. For that, I played the role of a kind of a conductor, manipulating the score for the musicians, using the screen-sharing feature of the video-conferencing software. The songs share a continuous melody, and, during the performance, I

switched first from the unison version of it to the one with two voices[56], then from the "normal" version to the version with grace notes, and then to the three-voiced version.

Of course, the latency was not the only thing that made playing simultaneously or in strict successions harder for musicians. It is quite hard to achieve perfect connection when six people are playing from different locations, especially if not all of them have access to really high-speed internet. Occasional jitters, distortions, and short drop-outs greatly affect the timbral perception of sound, making it hard to work out who plays what sometimes.

Another peculiar thing that happens during the performances of this piece sends us back to the idea of time retardation as a possibility for succession: every time the texture of the piece becomes more complex, musicians naturally play more and more slowly, slowing down to an extent that I would never expect to happen in the other pieces.

By placing the pieces in the order of composing them, I wanted to demonstrate the evolutionary character of the series development. All of them share the same investigatory intention, similar principles of ensemble interaction, and approaches to building the material, which, when put in various situations and affected by performance spaces, instrumentation, and my interaction with people who played them, gave quite different results, slowly growing in complexity.

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[56] In the first version, performed at the Spring Festival Online, the change from the first song to the second happened in the same fashion as in *Four songs*, at one of the moments indicated with arrows.

Conclusion. Further explorations

My principal approach to forming the *Songs* series is to work on one piece at a time, trying to spend as much time as possible on the rehearsals, trying to spot all the details in people's interpretations of my ideas, allowing them to alter my initial decisions. The series is far from being finished, and its growth will hopefully expand beyond my master studies. Writing one piece at a time, it is hard to predict the vector of the series' development. However, the last two pieces have gone quite far away from the first one and they raise many questions I want to explore in further pieces. In particular, *Up to fifteen songs* opens up an area of exploration of self-playing instruments and their interaction with human performers, and *Four more songs* is just a brief glance I took at the vast field of networked music performance, and I foresee a lot of possible ways of shaping performers' interaction this medium can offer. Finally, the latter also suggests a way of increasing the material's complexity and density while preserving its uncertainty, which can lead to a way of exploring not understanding of time within more traditional instrumental settings, without having to disrupt performer's interaction with external media of mechanical instruments or the internet.

My approach to this research is similar to that of working on the series. In fact, the pieces discussed in the last chapter are the main driving force of my research. Just as each piece had changed drastically the moment I brought a score to musicians, my theoretical pondering had changed its course every time the work on a new piece had been finished.

Just as the series will keep growing, my research will continue beyond the limits of this paper. It is impossible to predict the course of its development or whether it will reach its end or not, but there are many points I touch upon in this paper, which deserve much closer investigation.

The ideas of an instant and present moment has a vast tradition of contradicting philosophical speculations that could not find its place in this paper without making it significantly longer, yet I find them very important for my music. The idea of the measure itself seems rather underestimated and oversimplified in Bergson's theory, while Vvedensky, for instance, offers a very peculiar perspective on it, and it definitely worth more diligent studying. Finally, networked music performance will occupy my interest for a while in the nearest future as well, as it is something I had barely any time to properly explore and its impact on our perception of time is yet to be evaluated.

I see the main result of this research in having had several intense experiences of shared confusion with performers of my pieces. This confusion, based on disrupting the functionality of time-measuring models, gives rise to a more intuitive "feeling and not understanding" of time. For Bergson, the

basis of intuition is sympathy.[57] As an example of such sympathy, he gives pity, which he explains as a succession of conscious states "from repugnance to fear, from fear to sympathy, and from sympathy itself to humility."[58] This succession might be one of the most striking examples of duration he gives in his books because it shows that sympathy as "suffering others' pain" can be a foundation for experiencing the "real" time-duration. It is strikingly similar to one passage from Vvedensky's *Gray Notebook*, where he describes his dream where he saw a man to be hanged as a moment of experiencing time and death "which has stayed firmly inside" him: "I realized that I had nowhere to run. Because time is running with me and standing still with the sentenced one. And if we imagine its area, it's like one big chair on which both of us will sit down simultaneously. Afterward, I'll stand up and walk on, but he won't."[59]

Thus, it might be assumed that losing time can teach us to sympathize, and through this sympathy, we seem to be able to retain (or at least take a glance at) some other kind of time—the time we are yet to (not) understand.

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[57] Bergson, *The Creative Mind*, 189

[58] Bergson, *Time and Free Will,* 19

[59] Vvedensky, *The Gray Notebook*, 10

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Appendix.
Notes on organizing the Spring Festival Online[60]

Daniil Pilchen, Hidde Kramer, Domenic Jarlkaganova,
and Cristiano Melli

The idea of organizing this festival emerged as an attempt to substitute for the Spring Festival, an annual event built mainly around pieces written by students of the Royal Conservatoire's Composition Department, which was canceled because of the COVID-19 crisis. We wanted to create an opportunity for the students to still present their works, either adapting the ones they had written for the Spring Festival or completely new ones.

We wanted to keep the organization as horizontal as possible, avoiding any kind of selection or curatorship, narrowing down the role of organizers to merely helping composers with the technical preparation of their pieces and framing the event in such a way that every piece would be presented in the best way possible. Of course, this approach was complicated by the limits of our means of communication. Lacking physical presence, we had to organize everything over conference calls and emails, but these complications had been easily overcome due to everybody's involvement and enthusiasm.

Having started as a DIY student initiative, eventually, we got help from the Conservatoire's Marketing Department with the graphic materials and promotion, and Studio LOOS provided us with space we could use to run the streams, stable internet connection, and some equipment we were lacking.

In the end, it turned out to be an exploration of a wide range of possible networked concert situations: from fixed-media pieces and solo performances to ensemble pieces played by people from different countries, pieces with live electronics, and a sound installation.

We had a vision of having a fluent experience similar to sitting in a concert hall, where the audience is presented with a diverse program and is blissfully unaware of what's going on behind the scene to make it all happen technically and logistically. We also wanted to have as many pieces done live as possible with no prior recordings that we would just play. The tension of a live concert, where the outcome and course of the evening are not fixed, seemed very important in this concept.

Our first plan was to have every composer use their own streaming software and post links to their streams to a common website so the audience

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[60] This document may be updated after the completion of this paper. The newest version can be accessed via this link: https://bit.ly/SpringFestivalNotes

could click on them at the right time. Obviously, this posed a lot of hassle and challenges. If we couldn't stick to the right schedule people would have to start searching for the link that was active at the moment, and there was a lot more room for errors.

We had realized that to have this smooth experience we needed to 1) make all the transitions between the pieces fully automated so the audience would not have to do anything, and 2) create a kind of "virtual concert hall": a website with an embedded video-stream (the stage) and all the information about the program below it. In between the pieces, while we were making the transitions, we had waiting screens announcing each following piece. The site and the waiting screens were designed for us by Julian Verkerk.

To run the stream, we used a combination of different techniques, but the one we used the most was having a hub computer at Studio LOOS, capturing the sound and video from all the performers, and broadcasting it to Twitch with OBS (free and open-source broadcasting software, see obsproject.com). To capture the sound we used Source-Nexus and Source-Nexus Control (a virtual audio interface, see below for more details; a free alternative to it would be Soundflower, but its functionality is limited compared to Source-Nexus) on Mac and Voicemeeter on Windows, for video—simple screen capturing. More details about our streaming protocol in application to different pieces can be found in the next section.

General streaming protocol for the festival

For all the pieces that required live streaming, we used the combination of OBS and Twitch (we tried using YouTube before, but it has a tendency of blocking streams with music that cannot be identified by their algorithm). However, there could be plenty of different manipulations with sound and video before they get captured by OBS and broadcasted. These manipulations were different for each piece, but we managed to develop a more or less generalized protocol that could be applied (with variations) to all of them. From the perspective of applying this protocol to different pieces we had at the festival, they can be divided into three groups: ensemble pieces performed from several different rooms, solo pieces with processing and/or electronics performed in the same room as the streaming computer, and the pieces that required processing from a remote computer. As we used Mac and PC computers for different pieces (depending on the software needed, desired efficiency, or simply availability for some musicians), we provided the information for both when necessary.

2.1. For ensemble pieces:

2.1.1. For audio: Source-Connect Now. The players connect through a grid on Source-Connect Now (it works in Google Chrome, no additional software is needed). The hub computer (that handles the streaming) joins these grids when it is time for the piece to be performed.

2.1.2. For video: Zoom/Jitsi (preferably Zoom for quality, but the 40-minute restriction can be a problem). The players connect through a Zoom/Jitsi meeting with their microphones muted. The hub computer also joins the meeting with audio and video turned off.

2.1.3. For both audio and video at the same time: Source-Elements Meet. The audio quality is very high and can be compared to Source-Connect Now, but the video functionality is limited compared to Jitsi and Zoom.

2. For the solo pieces with processing:

2.1. On Mac:

2.1.1. To broadcast both the original sound from your microphone and the processed sound from a DAW, you need to route the sound between the programs using a virtual audio interface. We used Source-Nexus and Source-Nexus Control. Install both programs on your computer. In Source-Nexus Control, create two devices with two channels each.

2.1.2. In your audio settings, create a combined device ("aggregate device"), selecting both virtual devices you made and the internal output.

2.1.3. In your DAW, select the aggregate device as your sound device.

2.1.4. Make sure that all the audio tracks, including your live input, have their output set to a bus, call this bus the MixBus.

2.1.5. On the MixBus, create a send to another bus at 0.0dB. For the output of this send bus, select channels 5–6.

2.1.6. Use the second Nexus device (where you are sending the channels 5–6 to) as the input device in your streaming application.

2.2. On Windows:

2.2.1. Since Source-Nexus is not available for Windows, you need to use another software for creating virtual devices. We used Voicemeeter Potato. It is a complete vir-

tual internal sound card for Windows. It has multiple hardware inputs, as well as three "software channels" that have an input and output. The software channels are selectable as inputs and outputs in any software you use (DAWs, Zoom, Jitsi, Source-Connect Now, OBS, etc.), so with some smart routing, you can make a complete set-up for all the different pieces.

3. For the pieces that require processing from a remote computer:
   3.1. On Mac:
      3.1.1. Source-Connect Now, Source-Nexus, and Source-Nexus Control. Install Source-Nexus and Source-Nexus Control. In Control you can set-up virtual audio devices with a custom amount of channels. We used three devices with two channels each.
      3.1.2. In your audio settings, create an aggregate device and select both your main output and the two source nexus devices. Look closely in the overview on top which channels are the first two channels of the first Source Nexus device. With the system output that will most likely be channels 1–2 of the input channels, and channels 3–4 of the output channels. Also, look at which channels correspond with the second and third Nexus device. Rename the device for clarity.
      3.1.3. Connect to your Source-Connect Now grid (N.B. when setting up, use the stereo option 128kb/s) together with the player(s). In Settings, select the second Source-Nexus device as your input, and the first as your output.
      3.1.4. In your DAW, select the aggregate device you made as audio input and output. Create three (or more) audio tracks. One will function as the input of the performer's sound. On the other track(s) your electronics will be, one version to send to the player, one to the audience.
      3.1.5. Send the output of all your channels to a bus, call this MixBus.
      3.1.6. On the track for the input of the performer, select channels 1–2 as input channels, this will give you the input of the performer via Source Now.

3.1.7. On the track with the electronics going to the player, select channels 5–6 (so the second Nexus device) as the output, this will send the signal to the player via Source Now.

3.1.8. On the track with the electronics going to the audience—you should have the MixBus as output—you should be able to create a delay of the sound, in most DAWs this can be done via the inspector when you select the track. Use the delay function to synchronize the input of the player with the electronics again.

3.1.9. On the MixBus, create a send at 0.0dB to a new bus. Set the output of this bus to channels 7–8. This will send the audio to the third Nexus device which you will use as the input for your streaming application.

3.2. On Windows: use the same methodology but then everything is routed inside Voicemeeter Potato (installing some extra "Cable" applications from the Voicemeeter website is advised to have enough virtual inputs and outputs.

Festival program and technical set-ups of each piece

The program of the festival was built around the pieces using similar connection set-ups so we would use as little time for transition from one piece to another. However, after the festival was done, we had realized that tackling the technical set-up was not at all as difficult as we predicted, so we could have allowed ourselves to be more inventive with our program, using more different connection and software combinations each day. In the end, it is worth noting that, even though the internet imposes many limitations on the music material itself, on the programming side networked music concerts can be organized as freely as usual ones if given enough time and effort to prepare everything.

All the pieces on the first day of the festival were broadcasted from the hub computer we had set-up in Studio LOOS. For the ensemble pieces, we joined the video and audio grids in which musicians had been already waiting, and when it was the time to start the performance we started broadcasting video and audio outputs of all the musicians to our Twitch stream with OBS. Pieces with more performers alternated with pieces with less, including one fixed-media piece, which allowed to thoroughly prepare the start of the next piece so transition time would be as short as possible. In between the pieces we used waiting-screen images with the information about each coming piece.

The second day of the festival consisted almost exclusively of solo pieces that were broadcasted from the different performers' computers, reducing the role of organizers to mere communication between them and musicians. All the changes between computers were made using the streaming key, and to make the changes as swift as possible we used a separate channel of communication—an audio call. A person who had just stopped playing simply counted down and stopped the broadcast on their computer at the same time as the next person started. This allowed decreasing the gap between two broadcasts to the minimum. In between the pieces, we again used the waiting-screen images.

The whole of the third day of the festival was devoted to the eight-channel sound installation by Tilen Lebar, which was set-up on the separate webpage (tilenlebar.com) and was working all day (and probably still works). All we had to do was to put the link to the page on our website.

Pieces

Day 1

Yóuell Domenico, Patrick Ellis, Sebastiano Evangelista, Thanakarn Schofield. *Please, Sink HMS (Her Majesty's Service) - A Musical Suite*
Set-up: double bass (Cody Tacasz) connected with a piezo mic to the audio interface, fixed electronics, and a camera. The electronics were played to Cody on headphones, and then his sound, combined with the same electronics in DAW, was broadcasted to the listeners together with the picture from the camera.
Software: Voicemeeter Potato (virtual sound card for Windows, together with Cable A+B, to route all the sound internally). Studio One (DAW). OBS for broadcasting the stream.

Eva Beunk. *Somt Op*
Set-up: four people playing instruments in different rooms, some having external mic some using built-in laptop mic, all with headphones. A youtube video was played through Zoom from Eva's computer, together with the video from the performers.
Software: Zoom for video playback and video capturing from performers, Source-Connect Now for audio between musicians. From the broadcasting computer, we joined both Zoom and Source-Connect Now to capture all video and sound output. The sound output went through Voicemeeter to OBS.

Hidde Kramer. *Valse Lente/False Spring*

Set-up: two people (voice and violin) performing in different rooms. The singer used a phone as a microphone and the violinist used a stereo pair of microphones.
Software: Jitsi for video and Source-Connect Now for audio.

Robert Coleman and Pim Piët. *City Koto Triptych*
Video preloaded into OBS.

Daniil Pilchen. *Four songs*
Set-up: six people playing in different rooms all looking at the same score Danya was showing with screen-sharing.
Software: Source-Elements Meet for both video and audio.

Hidde Kramer. *The Voices Inside*
Set-up: Harry Golden playing tuba with a USB-microphone and Hidde processing the sound on his computer, different from the one he used for broadcasting.
Software: Source-Elements Meet for video and audio. Harry, the processing computer and the broadcasting computer were connected. On the processing computer Source-Nexus was used to get the sound into Logic Pro, and back out again to the Source Meet room, so both Harry and the broadcasting computer could hear it. The broadcasting computer got the original sound from Harry and the sound from the processing computer and broadcasted these.

Day 2

Arie Verheul van de Ven. *Duo for Altered Violas Altered for Single Altered Viola*
Set-up: Arie playing viola with a pick-up mic and electronics.
Software: the same as for Domenic's piece on the first day: Voicemeeter connected with Ableton and OBS.

Myrto Nizami and Mieke Robroeks. *Algal Bloom*
Video preloaded into OBS.

Yóuell Domenico. *Whoa*
The same set-up and software as for Arie's piece.
All three pieces were broadcasted from Arie's computer using OBS and the key to our Twitch stream.

Harry Golden. *Mother*
Set-up: Harry singing and playing the piano using a USB-mic.
Software: OBS with the stream-key

Wilf Amis. *The Future of Music*

Set-up: Wilf controlling his synthesizers with a phone.
Software: OBS with the stream-key and TouchOSC.

Day 3

Tilen Lebar. *Emancipated Fauna*
Fixed 8-channel installation, uploaded onto a separate webpage.

Recordings and general information about the festival

All the recordings and more information about the festival, including the information about performers and program notes, can be found on our website springfestivalonline.myportfolio.com

Useful resources

With this document, we are hoping to be helpful to those willing to organize their own online concerts and festivals, either now, when usual concerts are impossible, or later, for performing music over the internet is an exciting and vastly unexplored field. Our experience in no way exhausted the possibilities of this medium, so we think it might be useful to give links to some resources with more information about networked music performance.

The Constraints, Aesthetic Implications, and Creative Strategies of Composing for Networked Music Performance: Rebekah Wilson's extensive research about networked music performance, exploring both technical and aesthetic approaches to it.

Options for Remote Music Concerts: a very useful document compiled by Rebekah Wilson

Remote Live Music-Making With Jamulus. Jamulus is another piece of free software that allows for really good sound quality. We did not use it at the festival, but it might be very useful to take a look at it. Despite the name, the document also gives a very broad overview of the technical set-up needed for remote concerts, as well as other software.