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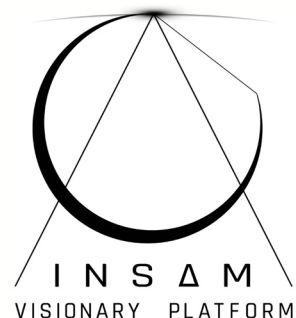
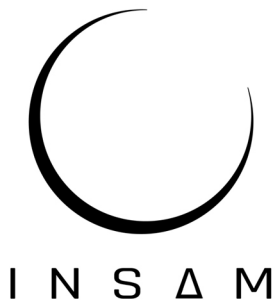
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## EDITOR'S FOREWORD

It seems both unusual and comfortable to write an Editorial piece for the tenth consecutive time – unusual because of the perceived speed with which we achieved these ten issues, but still comfortable because it seems to function as smoothly and as confidently as ever. The Editorial Team of the *INSAM Journal of Contemporary Music, Art and Technology* is delighted to introduce you to this jubilee issue of our publication!

Having in mind the foundational idea not only of our Journal but also the INSAM Institute itself, the main theme of this issue is titled “Technological Aspects of Contemporary Artistic and Scientific Research”. This theme was recognized as important, timely, and necessary by a number of authors coming from various disciplines.

The (Inter)Views section brings us three diverse pieces; the issue is opened by Aida Adžovič's interview with the legendary Slovene act Laibach regarding their performance of the *Wir sing das Volk* project at the Sarajevo National Theater on May 9, 2023. Following this, Marija Mitrović prepared an interview with media artist Leon Eckard, concerning this artist's views on contemporary art and the interaction between technology and human sensitivity. An essay by Alexander Liebermann on the early 20<sup>th</sup>-century composer Erwin Schulhoff, whose search for a unique personal voice could be encouraging in any given period, closes this rubric.

The Main theme section contains seven scientific articles. In the first one, Filipa Magalhães, Inês Filipe, Mariana Silva and Henrique Carvalho explore the process and details of technological and artistic challenges of reviving the music theater work *FE...DE...RI...CO...* (1987) by Constança Capdeville. The second article, written by Milan Milojković, is dedicated to the analysis of historical composer Vojislav Vučković and his ChatGPT-generated doppelgänger and opera. The fictional narrative woven around the actual historical figure served as an example of the current possibilities of AI in the domain of musicological work. In the next paper, Luís Arandas, Miguel Carvalhais and Mick Grierson

expand on their work on the film *Irreplaceable Biography*, which was created via language-guided generative models in audiovisual production. Thomas Moore focuses on the Belgium-based Nadar Ensemble and discusses the ways in which the performers of the ensemble understand the concept of the integrated concert and distinguish themselves from it, specifying the broadening of performers' competencies and responsibilities. In her paper, Dana Papachristou contributes to the discussion on the politics of connectivity based on the examination of three projects: the online project Xenakis Networked Performance Marathon 2022, 2023 Eleusis Mystery 91\_Magnetic Dance in Elefsina European Capital of Culture, and Spaces of Reflection offline PirateBox network in the 10<sup>th</sup> Berlin Biennale. The penultimate article in the section is written by Kenrick Ho and presents us with the author's composition *Flou* for solo violin through the prism of the relationship between (historically present) algorithmic processes, the composer, and the performer. Finally, Rijad Kaniža adds to the critical discourse on the reshaping of the musical experience via technology and the understanding of said technology using the example of *musique concrète*.

In the final Review section, which has been taken over by the section editor MA Rijad Kaniža, Bakir Memišević gives an overview of the 13<sup>th</sup> International Symposium "Music in Society" that was held in Sarajevo in December 2022.

During these several years, our team has grown bigger and stronger, and we will strive to continue on this path in the future. Some of the most important pieces of this puzzle – the enthusiastic authors, the devoted reviewers, our proof-reader and language editor, Anthony McLean, and our designer Milan Šuput – are staying consistent. For that, the Editorial Team of the *INSAM Journal* is immensely grateful.

In Belgrade, July 12, 2023,  
Bojana Radovanović,  
Editor-in-Chief



# (INTER) VIEWS

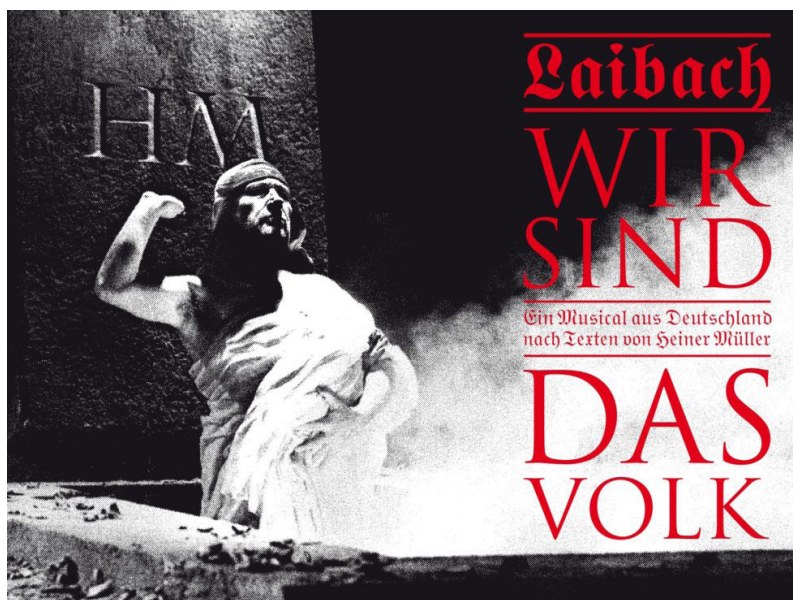


**Aida Adžović**

*Sarajevo, Bosnia and Herzegovina*

## **“EACH NATION HAS ITS OWN TRAUMA THAT REQUIRES A QUALIFIED EXORCIST”: Interview with Laibach**

To mark the closing of the 28<sup>th</sup> edition of the *Memory Module*, a cultural project realized by International Theater Festival MESS, on May 9, 2023 at the Sarajevo National Theatre, music and cross-media group Laibach released the theatre play *Wir sind das Volk – Ein Musical aus Deutschland*, based on motifs and texts by Heiner Müller (1929–1995), one of Germany’s most prominent dramatists and theatre directors.



This “apolitically-political musical”, initiated by dramatist and director Anja Quickert in 2019, brings together Müller’s and Laibach’s complementary poetics. Although it considers the situation in post-war Germany in the first place, this project, facing German national trauma and collective guilt, reveals many levels and forms of the nation(alism) and fascism in its current global omnipresence. As Laibach explained, they followed “Heiner Müller’s own strategy of cutting and rearranging the material, taking his text and putting it into another context, rebooting it with music, in order to drag the audience into it or alienate them from it. Music unlocks the emotions and is therefore a great manipulative tool and a powerful propagandistic weapon. And that’s why a combination of Heiner Müller, who saw theatre as a political institution, and Laibach, can be nothing else but a musical.”

With this musical stage performance, Laibach returned to the Sarajevo National Theatre, the place where this group played in November 1995 during the siege of Sarajevo and, as part of the political art collective Neue Slowenische Kunst, proclaimed this city as a territory of the abstract utopian *NSK State in Time*. Held in the spirit of cultural resistance against war destruction and violence on November 21, the day of reaching the Dayton Peace Agreement, Laibach’s concert is considered one of the most important events in besieged Sarajevo.

The staging of *Wir sind das Volk* on the Victory Day in the city where “European political history traumatically purged itself of its symptoms” correlates with the intention behind the project *Module Memory*: dealing with the past on the basis of artistic expression through its aesthetic and ethical essence.

In this interview, Laibach answered several questions regarding the idea behind the project *Wir sind das Volk*, their long-term connection with Sarajevo, and Laibach’s *modus operandi* in general.



Photo by Adnan Lingo

*The last time Laibach performed at the Sarajevo National Theatre was in November 1995, when the Dayton Peace Agreement was reached. This event in the (musical) history of Sarajevo was symbolically remembered as the beginning of peace and the normalizing of life. What did this visit and establishment of NSK State Sarajevo mean to Laibach? Was it an act of overidentification with the reality of the besieged city?*

In a manner of speaking, yes, but primarily our gesture was a humble but also necessary expression of solidarity with the besieged city and clear rejection of the logic of military aggression. By demonstrating the establishment of the NSK state on this occasion, we wanted to stress that the proclamation and practice of elementary statehood will be an important element in the constitution of peace in the territory of Bosnia and Herzegovina.

*This time, you are here on the occasion of your performance *Wir sind das Volk*, based on the writings of Heiner Müller (1929–1995), one of the most significant German-speaking playwrights since Brecht. How does Müller's poetics correspond with Laibach and the crisis of the actual moment?*

Like Laibach, Müller dealt a lot with German national traumas – and thus with patriotism. In the field of art, he radically practiced the denazification of Germany and mercilessly led the German nation through the purgatory of collective guilt. Laibach practices roughly the same with Slovenians, Austrians, Americans, Italians or Bosnians, and all other nations around the world, because each nation has its own trauma that requires and needs a good and qualified exorcist.

*Laibach is not art, Laibach is a statement, expressed by the rhetoric of totalitarianism. Laibach treats the ideologies and historical context along Duchamp's idea of ready-made, which is, by its nature, in an antinomial relation with the art. If we consider art as a space between reality and the truth, what is the position of Laibach in this context?*

As we already stated many times all art is subject to political manipulation, except for that which speaks the language of this same manipulation. To speak in political terms means to reveal and acknowledge the omnipresence of politics. The role of the most humane form of politics is the bridging of the gap between reality and the mobilizing spirit (*the truth*). Ideology takes the place of

authentic forms of social consciousness. The subject in modern society assumes the role of the politicized subject by acknowledging these facts. Laibach reveals and expresses the linkage of politics and ideology with art and culture and the unbridgeable gap between this links and the truth. As the *engineering of human souls* Laibach practices provocation on the revolted state of the alienated consciousness (which must necessarily find itself an enemy) and unites warriors and opponents into an expression of a static totalitarian cry.

*According to Müller's perspective, the function of art, which is political, is to call into question systems of values and beliefs as well as their (eventual) destruction. In this relation, politics represent what is "possible". On the other side, art, as a free space for imagination, reflects what is "impossible". Art affects politics by expanding the boundaries of "possible". Do you detect the provocation and theatricalization of manipulation as the only means of liberation and demystifying political power?*

We agree with Müller on this only conditionally and in the context of the foregoing. We certainly recognize provocation as a legitimate method of liberation, but not necessarily as the only means of demystifying political power. Provocation is most provocative and effective when it is least recognizable as such or when it operates under the guise of misleading representations.

Photo by Velija Hasanbegović



*Our reality is shaped by the mass production of information, which affirms language unification and algorithmically dictated behavior patterns. Is individuality just an illusion, and how does this situation change the value system in art?*

Of course, individuality is an illusion, except for the richest class, who own, advertise, and sell this illusion. This has been especially clear for at least the last thirty years, with the emergence of the World Wide Web and the digital distribution of information. Art has also long (if not always) been owned by capital, and therefore capital dictates its content and its value system. If we want this relationship to change, we need to change the system globally and from within. Politically and economically. Until then, we will continue to see art mainly and primarily as a helpless and essentially useless aesthetic tool of rich, perversely cynical, parvenus. The small part of the arts that may still be existing independently only confirms this blatant situation.

*Music infiltrates the emotional space as a perfect propaganda tool at this sentimental level. This exploitation of emotions is present in pop culture. It creates different identities and offers a sense of belonging. Identifying with a particular genre or statement usually implies excluding any other perspective. What is the position of pop culture in an ideological way, and how (a)political is it?*

Pop culture is as political as any other culture; furthermore, it is radically political in its deception and silly pretense, but it has long ceased to be on the left of the political spectrum, where it existed conditionally at least between the 1960s and the 1990s. It is now deeply rooted on the right, and it doesn't look like it will be moving anywhere else any time soon. Instead, pop culture is now becoming one of the greatest repositories of indigestible nonsense, unbearable conservatism, and primitive backwardness. Just like most politics as such in general. But its influence on social consciousness is still growing stronger.

*Laibach's symbols were often interpreted differently from the initial idea. How powerful can a system of symbols be? How do different interpretations, triggered by the same symbol in various contexts, reflect the state of social consciousness?*

Confucius already stated that symbols and signs rule the world, not words or laws. It is through symbols that man consciously or unconsciously lives, works, and has his being. It has been like that in the past and today, at the time of aggressive advertisement, when some of the most powerful symbols have even become a true modern work of art, this stands even more. Laibach's symbols were deliberately created and used in such a way that they cause confusion and skepticism, even rejection, and could be interpreted differently, depending on the angle or the context. Evading unified interpretations, our symbols thus nullify themselves. But with commercial and other ideological symbols (of power, politics, state, religion...) different logic is at work. Just as matter is highly concentrated energy, a symbol is highly concentrated meaning, creating a hidden language that emotionally sways the audience but also gives a sense of security and identity. Most omnipresent symbols do not allow different interpretations, they only offer different levels of standardization and points of identification for different social statuses and classes.



Photo by Vanja Čerimagić

*Laibach held a concert in North Korea in 2015. In the last few years, you have been trying to arrange a performance of your symphonic work Alamut in Iran. What is the aim of visiting countries that the Occident considers embodying totalitarianism? Does this act represent a form of demystifying all general narratives created in the East related to the West and Western prejudices towards the East?*

It is not only the question of East and West opposing narratives; Laibach can't (and don't want to) make difference between one and the other totalitarianism. People are people everywhere and we can also find basic inspiration for our delivery everywhere. The reason we want to present our symphonic work *Alamut* in Iran is simple; the story, as described in the novel by the Slovenian writer Vladimir Bartol, takes place in Iran in the 11<sup>th</sup> century, and Iranian musicians and composers also participate in the creation and performance. Iran has an exceptional musical, poetic and philosophical tradition, so it is logical that the symphony, which deals with the relationship between politics and religion and the mechanisms of manipulation, should also be presented in Iran.

*Laibach is the knowledge of the universality of the moment. It is the return of action on behalf of the idea. Is this statement the key to Laibach's sustainability for over 40 years?*

It is our duty and responsibility to be who we are and to respond relevantly to the stimuli of the zeitgeist. Forty years is objectively not a particularly long period, we still have a lot of work to do.



**Marija Mitrović**

*Podgorica, Montenegro*

## **MORPHOLOGY OF SENSUAL ALGORITHMS: Interview with Leon Eckard**

By creating sensitive and interactive socio-cultural dialogues with and within technologies, media artist Leon Eckard reveals his understanding of technology as human extension and reflection of the self. While his artistic visions have already travelled the world (Kumasi, Barcelona, Dresden, Cologne, Paris, Teheran etc.), Leon is currently studying Art and Media at the University of the Arts (UdK) Berlin, where he also works as a tutor in class of Generative Arts. Through his works, Leon explores a multitude of virtual spaces, thoughts and relations by expanding our senses and cognitive functions onto machines and algorithms. Since he is coming from a jazz guitar background, he tries to connect intuitive musical sense within a self-developed audio processing system that evokes transformations of our (sonic) environment. Also, he designs interactive installations that make the line between natural and artificial surroundings blurred. Concerning my curiosity for combining acoustics and electronics, tradition and modification, contemplation and acceleration, our conversation revolved around Leon's perception of the focal point regarding contemporary art and critical discourse and also the ways of mutual interaction between human sensitivity and technology.



*Contemporary artworks being produced nowadays seems to fall between diverse media, that is, as Dick Higgins stated, no accident since we are approaching the dawn of a classless society to which separation into rigid categories is absolutely irrelevant. Regarding the critical destruction of medium as an ontological category of the most important art of the 1960s, what is your opinion on the meaning of an artwork categorization today?*

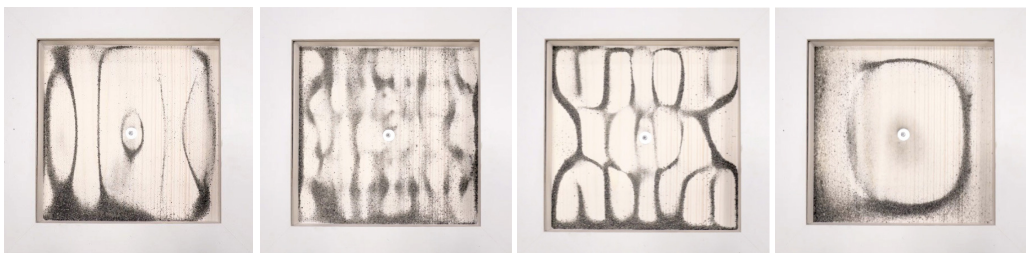
From my perspective, the categorization of art still makes sense, but mainly for the need of speaking about it. The concept of art and the artistic practice is constantly expanding. I also notice increasing collaborations between different branches of arts and sciences, which is not a surprise regarding overwhelming technological developments. However, it is almost impossible to grasp all aspects to work with a certain technology. My artistic practice is usually connected with fields of *generative art*, *media art*, *sound art* or *installation art*, and all these terms are correct and even necessary to intelligibly communicate ideas. In spite of that, an exact category for my work doesn't play an important role. My field of interest and personal artistic practice usually develop within a certain space, which then has intersections with several classifications, each emphasizing different aspects. One should just be aware of the assumption that each generalization is an abstraction that reduces the information and the fact that it is really important to occasionally question these categories. Therefore, it is better to form an autonomous, self-sufficient impression of an artist and his/her work because ultimately, it is not the category that defines the work, but the other way around.

*Since I find your artworks really diverse regarding the medium, idea and experience, I would like to know where does your initial creative energy come from?*

The process of creating an artwork, from my point of view, means boundless and continual exploration. It begins in a world of endless possibilities and an infinite amount of material and resources – my own imagination. This exploration is the exploration of the Self – for my part the only directly accessible entity in the universe, since it is the filter I perceive everything through. Regardless of the medium, technological aspects or the material I use to create an artwork, my work primarily guides me to understand myself and therefore others and the world around me – which in a certain way is the very same since everything is part of the same system. Sometimes, I like to think of my personal creative process as an *applied philosophy*, because what I mostly do is bring to life to my day-to-day little thought experiments.

*Your work *Metamorphosen – Topology of the City*, is a site-specific multimedia installation that is a really beautiful example of the use of sensual algorithms since it is based on sculptural objects, live performance and its modulation with several algorithms. Could you tell me what this work means to you and where do you see its importance regarding contemporary art practices nowadays?*

I like the term sensual algorithm, since it describes very well what I am doing. Algorithms are all around us. They are underlying logics and abstract truths about our environment. They describe invisible patterns and processes. The beauty of algorithms is their abstractness. I like to embed them in sonic but also visual contexts, so they become sensual, as in, for instance, the collaborative work *Metamorphosen – Topology of the City*. Initiated by visual artist Yoana Tuzharova, we wanted to translate the underlying structure of economic development in Germany into several media. Together, we closely worked on a sound sculpture that is connected to the DAX data – an algorithm calculating a number depending on the performance of the 40 biggest German companies. In other words, the algorithm tells us about the development of the German economy, though in a very abstract way. The flutist Francesco Marzano made an intuitive composition based on these data and I translated it into sine waves, which will vibrate a plate with charcoal on it. The plate generates different patterns, depending on the frequencies, which is not only a part of the exhibition but also serves as a model for tiles, which Yoana again used to build new sculptures. Through this whole process of translating we wanted to give a new understanding and sensual experience of this algorithm and eventually of an abstract phenomena – economic development.

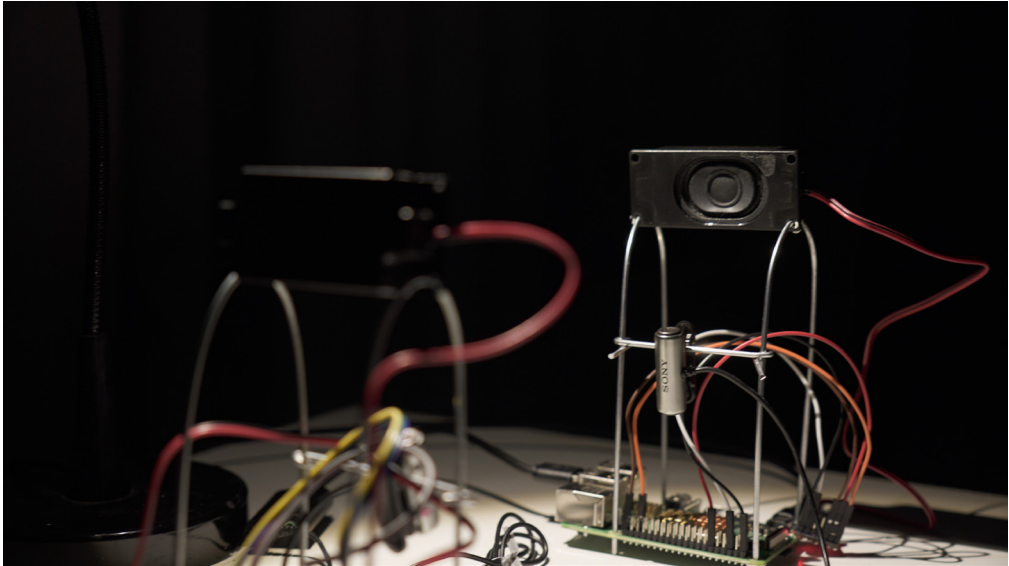




*Your latest works deal with subjects of authorship, technology and human–machine mutual exchange and evolutionary relation. You use technology as an extension and reflection of the self, where the line between an artist and a machine becomes blurred. Could you tell me more about your understanding and meaning of technological use within creative artistic practices?*

I have been in love with technology since forever and playing with it artistically opened up the space of limitless possibilities for me. In my opinion, this creative process that considers human–technology interaction is necessary to reflect upon and develop, and it is crucial to have space in society to explore these media in a non-profit orientated manner. In my latest work *Der Bewusstseinsautomat – ein Dialog zwischen Maschinen*, I explore the blurring line between artist and machine while asking myself how a collaboration and symbiosis could look like, to what dimension I extend myself onto them and, also, what differs us from these machines? The work consists of two chatbots talking with each other about the implication of their conversation, while the audience can also join their discussion. The whole work, including the concept, is developed together with a chatbot, which is also part of their discussion. An interesting philosopher and also inspiration for this work was Vilem Flusser. According to him, we are heading towards a telematic society, in which everyone is interconnected and ever-producing. The anyway irrelevant question of authorship finally loses its meaning and society is an interconnected whole that creates, exchanges and modifies. He believed in the potential of these technologies to create a utopia, though we must lead this technology in the right direction. Otherwise, we will end up in a world of complete overproduction of technical images, where meaning fades gradually and people get bored and uncreative. And even more

importantly, an asynchronous relation between sender and receiver, as is currently the case, creates fascistic structures. New media is a chance of democratization, but also contains the risk of totalitarianism. So, the role of the artist is not only to create interesting *technical images*, with these ungraspable apparatuses, but to question, understand and reinvent their use.



*Most of your works consist of different technological uses, electronics and modifications combined with acoustic, pure perception and tradition. I find this approach very meaningful since in this way you are able to simultaneously create, innovate and make an intensive emotional impact. One example is your work *The Belafon*, but there are more. Could you tell me more about this approach to an artwork?*

Since technology is omnipresent in my work, there comes a time when I feel overwhelmed and need some distance from its complexity. In these moments, it helps me a lot to come back to basics and just improvise on my guitar for a while. It is an intuitive and natural process that can very quickly clear my mind. Also, while I am meditating, I can feel the impact technology use has on me. How often certain impressions pop up in my mind and how my concentration span is affected. This doesn't mean that technology is bad, it is more about how we use it. Since I was simultaneously exploring jazz guitar and media arts, it seemed to clash but eventually it all made sense to me and it was just a question of time until I combined both approaches. During a residency at pIAR (perfoCrazy International Artist Residency) in Kumasi, Ghana, I started to modify an instrument called Balafon. I attached several sensors and controllers and connected a

Bela microcomputer with SuperCollider running on it. Now I can play on it and the sound alters through my playing, but also through the controllers I attached. In this way I could finally play intuitively with an acoustic instrument and use that process as a basis for my algorithms to conquer. It is also in a way a sensual algorithm. This new instrument is now called *Belafon*.



*Also, your work Defragmentation is based on an expansion of our senses and cognitive functions onto machines and algorithms. I found it very interesting the way you fuse emotional and technological fragmentation to re-contextualize an artwork of post-humanity. Can you tell me more about this process from an intuitive musical fragment that is fed into the algorithm and finally altered into diverse polyphonic soundscapes?*

Since the *Belafon* I started to also modify my guitar and develop my own effect chains and use them in a performance series, which I initially called *Defragmentation*. The name described my own feeling of scatteredness into a multitude of virtual spaces, thoughts and relations. I played small musical fragments into the algorithms and then transformed them throughout the performance. Though I changed the name to *Cybernetic Reverie*, since I feel I slowly overcame the process of feeling scattered, but rather began to make sense of these fragments. I understand my performances and also some of my works as a cybernetic process, where I am combining organic and artificial systems. My improvised play with it creates a form of feedback and merges us into a bigger system, generating a dreamlike state and soundscape that is both organic and machine-driven. The telematic society will be a cybernetic one. We are already merging with machines and they merge with us.

*Passive enjoyment of traditional forms is exchanged by the participatory function of an interactive art that expands the range of art experiences available to the audience by offering levels of 'free choice'. What is your opinion of open-ended decision-making or free will in interactive and generative art?*

Free will or choice in interactive art is interesting to me, since it creates several layers to the experience. The moment where the visitor notices their effect on the artwork, they immediately become part of the whole and the artwork cannot be seen anymore as an independent system. Suddenly, you are part of the artwork. On the other hand, the interactivity adds a subjectivity to the experience, which can make the artwork more personal. The visitor can explore the artwork how they want. However, for my works, it depends on the concept, if I will add an interactive or generative layer. For example in my work *Toter Winkel*, which deals with illusionary perception, it is very important that the visitor can decide whether they go upwards or downwards. It is a reflection of our free choices, within our closed inner space.



*Do you create all sounds and sound effects by yourself or do you use pre-existing ones? Could you say more about tools and compositional techniques that you use for your creative process?*

*Sounds...dematerialize the substance of things they resounded and extend their own patterns...they drift off things and link up with one another (Alphonso Lingis).*

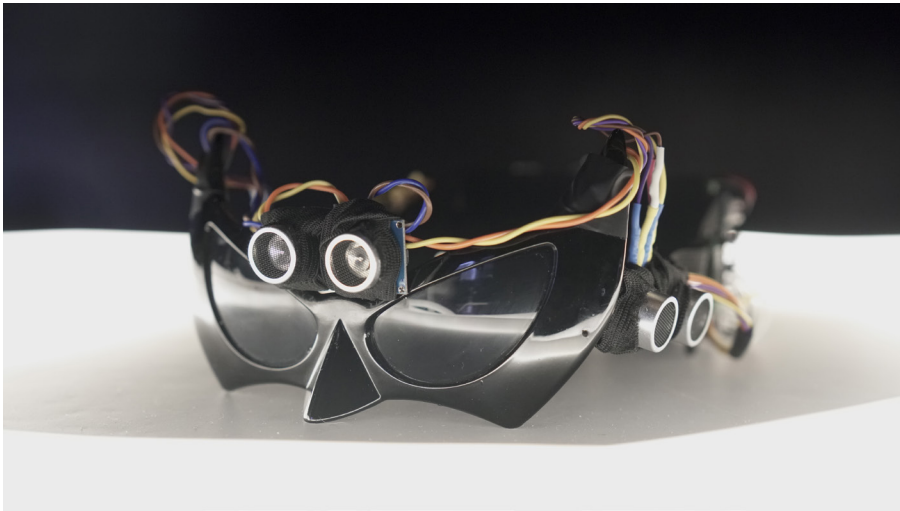
That is a beautiful quote. My approach to sound is to create everything myself. I love to work on little details and to have control over all parameters. The software I mainly work with is SuperCollider, an open-source programming language for generating sound. Though I also use Linux systems and processing – all open-source software. In my live performances, I use only acoustic sound generation with physical instruments and run them through a chain of algorithms I have wrote. In my installative works, I also use sound samples I have recorded, for example in *Invisible Habitats*. Compositionally I try to find a balance between aesthetics and concept. Though the compositional approach for each work is determined by the concept.



For example, the work *What is it (not) like to be a bat*, a sound generating headset equipped with ultrasonic sensors and a gyroscope demands a composition that reacts on the data of the sensors. So, I chose to work with repetitive patterns, which modulate the sound according to the input. First, I think of the concept and what the basic features for the musical composition are. Then, I



think of how to implement these features and where to modulate the sound to generate interesting results. During my live performances, I work more intuitively and improvised. I usually have an idea of where I start and where I end. It mostly correlates to emotional states or recent situations. I like to create setups and works which can surprise even myself – that is the beauty of generative art and algorithms for me. You create a system that is complex enough to not be understood anymore and maybe other people come and find a whole new way to interact with it. That connects also to the authorship topic, covered before.



*What are your future challenges regarding the contemporary scene in Berlin? Will you keep exploring interaction between human sensitivity and technology or is your focal point changing? How do you see the path of the contemporary art scene? In which direction is it going?*

I am currently thinking about a new work that will be focused on exploring the idea of self-organization and emergence. It will definitely be an interactive artwork with sound as the sensual medium between the idea and the human. I don't think about where my focal point lies or if my artwork aligns with what I did before. My main drive is still the exploration of the self and the nature of reality, so I am sure that over time a general topic will extract even clearer. Generally, I can't say where the contemporary art scene is evolving to and it is also not so interesting to me. What interests me is more the scientific, philosophical and political discourse. Berlin is a great place for media art and all kinds of experimental works. Many people are open-minded and a lot of opportunities exist. But it is possible to gain access to information and discourses from everywhere

with the help of the Internet. I think art will be even more interdisciplinary in the future and open-source culture makes it more accessible. In collaboration with science and other branches, I hope that art can also impact more outside its circles and create discourse not only about itself, but about all of us.

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# **ERWIN SCHULHOFF: A SOURCE OF INSPIRATION FOR TODAY'S COMPOSERS IN THE SEARCH FOR PERSONAL STYLE**

## **I. Introduction**

In previous centuries, music was often confined within the boundaries of a predominant aesthetic. In today's world, the musical landscape is permeated by a multitude of styles, genres, and aesthetics, offering us a wealth of diverse works to enjoy, ranging from the avant-garde compositions of Lachenmann to the energetic rock of AC/DC and the captivating pop of Beyoncé. This dynamic mosaic of musical expressions, which began at the turn of the 20<sup>th</sup> century with the simultaneous development of Impressionism, Dodecaphonism, jazz, and other influential movements and genres, brought both liberation and challenges to composers. While it opened doors to limitless creative possibilities, it also posed complicated challenges for composers who explored the wide world of musical expression and tried to find their own voice. Today, young composers face a comparable, if not more complex, dilemma when deciding on the "style" for their next composition. Composers are exposed to a myriad of musical styles and aesthetics, each possessing its own allure and purpose. With so many styles of music to choose from, a question inevitably arises: "How can we find a personal voice amidst the vast plethora of musical styles?" When we reflect upon the early 20<sup>th</sup> century, we find that composer Erwin Schulhoff (1894–1942) encountered a similar situation to the one faced by countless composers to-

day. However, despite the emergence of various new aesthetics during his time, Schulhoff successfully forged his own unique voice. By exploring Schulhoff's life and music, this essay aims to provide insights into the process of developing a distinct artistic voice. In doing so, it seeks to inspire young composers in their pursuit of finding their own creative identity amidst the vast and diverse musical landscape of today.

## II. Schulhoff's Search for a Personal Language

Schulhoff's life can be divided into four distinct creative periods, three of which will be discussed in this essay. The fourth and final period, characterized by his political inclination towards communism, falls outside the scope of this discussion.

Erwin Schulhoff, born in Prague in 1894 to a Czech-German family, displayed a deep passion for music and the piano from a young age. His first creative period, extending from his initial composition in 1902 to one year after the conclusion of the First World War in 1919, was marked by a strong influence of Post-Romantic music, with notable inspiration drawn from the works of Richard Strauss. Many of Schulhoff's works display parallels with Strauss's harmony and orchestration, evident in compositions like *Drei Lieder für Sopranstimme und Klavier* (WV 33)<sup>1</sup> and *Landschaften* (WV 44). However, Schulhoff's curiosity as a composer led him to explore and draw inspiration from other musical expressions of his time. During his studies in Leipzig and Cologne between 1908 and 1913, Schulhoff encountered the transformative music of Scriabin and Debussy.<sup>2</sup> In particular, the harmonic innovations of Debussy had a profound impact on Schulhoff's musical language, which became increasingly evident in his compositions. Works such as *Vier Bilder für Klavier* (WV 22) and *Fünf Impressionen für Klavier* (WV 29) exemplify Schulhoff's incorporation of Impressionist elements best.

After serving as a soldier on multiple fronts during the First World War, Schulhoff's musical language underwent a significant transformation, signaling the start of his second creative phase. This period, spanning approximately from 1919 to 1923, is distinguished by a three-pronged exploration. On one hand, he

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1 WV stands for "Werkeverzeichnis" (work catalogue) which is the catalogue of Schulhoff's works. This comprehensive catalogue was created by Josef Bek, a pioneer in Schulhoff research and the author of the biography titled *Erwin Schulhoff: Leben und Werk*. Within the catalogue, you can find both published and unpublished works, as well as unfinished sketches and compositions from Schulhoff's student years. The works in the catalogue are systematically numbered in chronological order, with the date of completion serving as the determining factor for their classification.

2 Josef Bek, *Erwin Schulhoff: Leben und Werk* (Hamburg: von Bockel, 1994), 24.

delved into Free Atonality, drawing inspiration from the German Expressionist composers of the Second Viennese School. Simultaneously, Schulhoff began incorporating melodies, harmonies, and rhythms from the newly arrived jazz genre in Europe into his compositions. Finally, he also ventured into the realm of the Dadaist movement, resulting in bold, satirical, and unconventional approaches to composition. For Schulhoff, jazz and Dadaism often became synonymous, as he utilized jazz to convey Dadaist ideas while maintaining Expressionism as a distinct and unique concept. Some of the most well-known pieces from that time include the Expressionist *Zehn Klavierstücke* (WV 50), and the Dadaist *Fünf Pittoresken für Klavier* (WV 51), which features four jazz-inspired movements and one satirical silent piece of music titled “In Futurum”.<sup>3</sup>

In both the first and second periods, we witness Schulhoff’s unwavering pursuit to discover his personal artistic voice by incorporating the diverse styles and genres of his time. Schulhoff’s engagement with these innovative musical forms demonstrates his willingness to push boundaries and embrace the evolving artistic landscape of his era. However, it is notable that the music composed during these periods sometimes gives the impression that Schulhoff is intentionally adopting a particular style to convey his ideas. Nevertheless, a significant shift was about to take place in the subsequent period.

In 1923, following a period of several years in Germany, Schulhoff made the decision to return to his hometown of Prague. This homecoming reignited his passion for the folk traditions and musical heritage of his country. Under the profound influence of Janáček’s works, Schulhoff’s compositions experienced a significant transformation, embracing distinct folk elements such as dance motifs, modal melodies, and mixed meters.<sup>4</sup> The lively third movement of his composition *Fünf Stücke für Streichquartett* (WV 68), titled “Alla Czecha”, exemplifies this renewed passion for Czech music best. The year 1924 marks the onset of Schulhoff’s third creative period, marked by a synthesis of avant-garde styles such as Impressionism, Neoclassicism, and jazz, along with a revitalized focus on the folk elements of his homeland. This period signifies Schulhoff’s artistic maturity, exemplified by the development of a distinct and idiosyncratic style that arises from the fusion and integration of diverse artistic influences. In other words, Schulhoff succeeded in forging his own artistic voice by amalgamating

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3 It is worth mentioning that *Fünf Pittoresken* represents a double novelty. Firstly, it stands as one of the earliest “classical” compositions in Europe to consistently incorporate jazz elements, with Igor Stravinsky’s *Piano-Rag-Music* (KV032) preceding Schulhoff’s work by only a few months in 1919. Secondly, the third movement, “In Futurum”, is one of the rare instances of a silent piece of music predating John Cage’s conceptual piece *4’33”*. In this regard, Schulhoff’s *Fünf Pittoresken* holds a significant place in the annals of Western music history, serving as a notable milestone.

4 Bek, *Erwin Schulhoff: Leben und Werk*, 62–66.

the elements of the music he admired into a distinctive and personal blend. A closer analysis of both violin sonatas allows for a deeper understanding of the contrast between them. The first violin sonata, *Sonate für Violine und Klavier* (WV 24), composed in 1913 during Schulhoff's first creative period, demonstrates a distinct contrast between its movements, each showcasing the influence of different styles. The first movement is characterized by elements of Post-Romanticism and even Expressionism, while the second movement exhibits an Impressionistic quality. The final two movements lean towards a Neoclassical style. In contrast, the second violin sonata, *Sonate pour violon et piano* (WV 91), composed in 1927 during Schulhoff's third creative period, consists of four distinct movements, yet they are all written in one cohesive and unified style. The difference is subtle, yet crucial: the first sonata is eclectic, incorporating various styles, while the second sonata embodies a single style composed of different stylistic elements. In both cases, the heterogeneous quality of Schulhoff's music is preserved, but in the second sonata it has been developed into a distinctive style. Consequently, within a musical landscape teeming with new and flourishing styles, Schulhoff managed to carve out his own distinctive artistic language.

### **III. Conclusion**

In conclusion, Schulhoff's life and music serve as a compelling and enduring source of inspiration and encouragement for composers in today's world. With a global population of eight billion people and an expansive and diverse musical landscape, the challenge of finding a personal artistic voice may seem more complex than ever before. However, Schulhoff's legacy stands as a powerful reminder that the pursuit of an idiosyncratic artistic voice is attainable even amidst a myriad of musical styles. Just as Schulhoff fearlessly integrated folk, jazz, and various other stylistic elements into his compositions during the early 20<sup>th</sup> century, composers of today are afforded the freedom to venture into a diverse spectrum of musical genres, ranging from Lachenmann to AC/DC, Beyoncé, and beyond. By cultivating curiosity, embracing openness to new ideas, and persistently seeking inspiration from the multitude of emerging styles, composers can embark on a transformative journey that propels them towards the discovery of their own unique and authentic creative voice.

MAIN THEME:  
TECHNOLOGICAL ASPECTS  
OF CONTEMPORARY ARTISTIC  
AND SCIENTIFIC RESEARCH



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**TECHNOLOGICAL AND ARTISTIC  
CHALLENGES IN THE RE-  
PERFORMANCE OF MUSIC  
THEATRE WORK  
FE...DE...RI...CO... (1987) BY  
CONSTANÇA CAPDEVILLE:  
FROM THE ARCHIVE TO THE  
STAGE**

**Abstract:** In this article a group of authors will discuss the documentation process carried out by Filipa Magalhães during her PhD research, who gathered all possible materials concerning the music theatre work *FE...DE...RI...CO...* (1987) by Constança Capdeville. She created a more

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complete script (based on the information left by Capdeville, such as scores, texts, drawings, sketches with stage indications, scripts containing the main lines, and scripts for sound and light) aiming to document the several layers of information in order to systematize the work for archival purposes. The music theatre as a performative genre is a synthesis of multimedia artform that involves technological resources (for example the magnetic tape medium), which are aimed to be preserved, exploited, and valorized in order to make re-performance feasible. We will focus on the understanding of the difficulties and challenges found to bring this performance back from the archive to the stage.

**Keywords:** Constança Capdeville, music theatre, preservation, documentation, analog recordings, re-performance, audio signal processing.

*FE...DE...RI...CO...* (1987) is a music theatre work created by the composer Constança Capdeville,<sup>2</sup> based on the poetic, plastic and musical work of Federico Garcia Lorca, composed for the commemoration of the 50<sup>th</sup> anniversary of the death of the Spanish writer. This performance was part of a series of events that integrated the cycle “Encontro com Lorca” [Meeting Lorca], premiered in Lisbon at the Calouste Gulbenkian Foundation (FCG) in the multi-purpose hall of the Modern Art Centre (CAM) under the responsibility of ACARTE, the Gulbenkian Foundation’s Department of Artistic Creation and Art Education, on 10 March 1987, and performed by the ColecViva.<sup>3</sup> *FE...DE...RI...CO...* is divided into fifteen sequences: *Este é o prólogo*; *Canção dos ceifeiros*; *A voz do poeta*; *Duplo embalo*; *Silêncio*; *Mutação*; *Canção*; *Palimpsesto I*; *Duas histórias com sombras*; *Palimpsesto II*; *O passeio de Buster Keaton*; *Estampa e canção*; *Palimpsesto III*; *Introdução e embalo do espelho adormecido*; and *Eu sei que o meu perfil será tran-*

2 Constança Capdeville (1937–1992) was a composer, pianist, percussionist and teacher, considered the greatest figure of the performative genre music theatre in Portugal. For more information about the music theatre of Capdeville see articles by Filipa Magalhães (2022; 2022a; 2022b) and Magalhães and Pires (2019).

3 It was a group created by Constança Capdeville in 1985 for the purpose of performing her own music theatre pieces. The group consisted of the founding members: Luís Madureira (voice), João Natividade (dance, movement, mime), Olga Prats (piano), Alejandro Erlich-Oliva (double bass), António Sousa Dias (direction assistant, percussion, sound synthesis), Constança Capdeville (direction, percussion and piano). Occasionally, some of the performances they produced included guests, such as the Portuguese actress Eunice Muñoz (Magalhães and Pires 2019, 102) or Paula Pires de Matos (sound and slides assistant) and Paulo Graça (lighting), both responsible for technical issues.

*quilo*.<sup>4</sup> For this work, Capdeville used excerpts or entire parts of scores, drawings, texts from theatre plays and poems from the book entitled *Obras completas* [Complete Works] by Federico Garcia Lorca. However, Capdeville composed original songs as the “Canção dos Ceifeiros” [“Song of the Reapers”], she used complete pieces from other composers such as the song *Nana* from Manuel de Falla, *Caixinha de Música* by composer António Sousa Dias, and a self-citation by her own piece called *Caixinha de Música*; she also made musical arrangements of works from composers such as Erik Satie and Scott Joplin. As stated by Filipa Magalhães and Isabel Pires, Capdeville’s recourse to the quotation of musical and other sources as a compositional element runs transversally through all her music-theatre works, and one may even assert that the act of quotation is sometimes the performance itself and it is:

[c]ommonly observed within Capdeville’s documentation is the current practice of reusing materials from different sources, such as excerpts of music by other composers, texts by poets or writers or even drawings by famous painters, coupled with her ability to endow them with new garments and to assign them new meanings, constituting a latent feature of her aesthetics (2019, 96).

In the programme note of *FE...DE...RI...CO...* that exists in the Gulbenkian Archives from FCG, Capdeville wrote that elements such as the water, the mirror and the trading floor are used in this performance because these are the symbols that, according to the composer, not only marked the sensibility of Lorca, but also expressed the poet’s complex and mysterious inner universe.<sup>5</sup> The composer describes how she used these symbols: the sound of water, pre-recorded on magnetic tape, starts and ends the performance; the mirror, according to her, reflects the world of images exposed by Salvador Dalí’s paintings; and so forth.<sup>6</sup>

The music theatre work *FE...DE...RI...CO...* was recently re-performed (on 4 and 5 November 2022) in Teatro Aberto in Lisbon, Portugal. This production was organized within the scope of Festival Criasons IV and had the support of Musicamera Produções.<sup>7</sup> The scenic recreation was undertaken by researcher Filipa Magalhães (from her PhD thesis) and producer Élio Correia, and with the collaboration of composer Carlos Alberto Augusto (artistic and music consultant), conductor Brian MacKay (artistic direction), composer António de Sousa Dias (artistic and music consultant), Luís Pacheco Cunha (musicamera producer

4 Information collected from the programme note of *FE...DE...RI...CO...*’s premiere in 1987 (S.A. 1987).

5 Source: programme note of *FE...DE...RI...CO...*’s premiere in 1987 (S.A. 1987).

6 Ibid.

7 For more information, see: <https://musicamera.pt/festival-criasons-iv/> (accessed on 1 July 2023).

and director) and Mariana Silva Godinho (production, slides operator), in addition to Anabela Gaspar (lighting designer), Henrique Lobo de Carvalho (sound operator), and André Roma (image). This recreation had the participation of the performers: Ângelo Cid Neto (dancer, movement), Inês Filipe (piano), Joana Manuel (actress), Mário Franco (double bass), Miguel Maduro-Dias (voice) and Taíssa Poliakova Cunha (piano, percussion), a new generation of performers who dared to recreate the first formation of the ColecViva group.<sup>8</sup>

For this re-performance we sought to be faithful to the original artistic object while looking for clues for the renewal of the music theatre genre, allowing its access to the new generations of performers and audiences. In this article we intend to discuss the main constraints faced in the recovery of the original work *FE...DE...RI...CO...* focusing on the technological and artistic challenges found during its re-performance and reflecting about aspects of its preservation that may be relevant for archival purposes.

### **Documentation process: tracking the sources of *FE...DE...RI...CO...***

With regard to the organization of the various materials, despite a preliminary inventory that has been carried out by the archivists of the National Library of Portugal (BNP), the documentation is still quite dispersed and needs to be systematized. This work requires an adequate documentation strategy concerning the description of the different documents, which are by nature heterogeneous, so one can understand interactions between them. Currently, Capdeville's collection is in the custody of the BNP, but some documents, which are part of the work, are in the custody of ColecViva's founding members, who took part in the original performance. In this sense, new knowledge was produced based on the testimonies of former ColecViva members, namely: Alejandro Erlich-Oliva, João Natividade, Luís Madureira, Olga Prats and António de Sousa Dias. These not only provided some of the material from their archives, but also information about aspects of the performance that were imperceptible from the documents, allowing the recreation of obscured elements of the work. The dispersion of materials, such as objects, props, scores or scripts, among others, occurs because *FE...DE...RI...CO...* resulted from a collaborative work between the various members of ColecViva, who occasionally worked individually with the composer, writing specific indications in their own scores. In Capdeville's collection at the BNP one can find several kinds of scripts, composer's notes, images, sketches, tape and video recording, as well as additional documentation (press reviews, programme notes, stage settings, sheets describing live and recorded

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8 Ibid.

sound effects, notes on scenery, musical instruments required, objects, description of events that occur on or off stage, behind the screen or around the piano, among others. Thus, for this work Capdeville deployed three levels of scripts: 1) short script, indicating every scene or the main lines, but not specifying the content. This script functioned as a guide to Capdeville, since she was also a performer in her own works (it contains the symbol “CC”); 2) scripts for lights and sound recording, which were reduced versions with only the main lines; and 3) individual scripts, created by the performers themselves, as they came from distinctive artistic backgrounds (Magalhães and Pires 2019, 103). According to António de Sousa Dias, who was also responsible for the magnetic tape editing, the need to create different scripts and other related documents was due to the fact that the performance embraced different artistic expressions in order to ease the communication between performers. However, a study of the work only from the scripts proves to be insufficient, even for those who were directly involved in the original performances and, if one intends to study the work, it is therefore important to adopt another strategy. Consequently, if from the existing documentation founding members find difficulties in understanding the articulation between the different layers that comprise the work, for musicologists this task is even more complex. However, the musicologist’s task is precisely to understand the collaborative processes leading to the recreation of the work, as an attempt to conduct archaeology of it.

### **Documenting the technological resources: video and tape recording**

The video recording of the performance<sup>9</sup> *FE...DE...RI...CO...* (1987) by Constança Capdeville, although its “footage was in poor condition, with low lighting levels and without any proper documentation of it yet achieved as some key aspects of the performance were missing” (Magalhães 2021: 16), helped in the documentation process. Nevertheless, documenting a performance only through the video may be insufficient as in this specific case, for a number of reasons. First, the camera focus is unidirectional, therefore it is not possible to follow all the events of the performance. Secondly, some parts are cut demanding a total reconstruction through the documents (scripts, pictures, additional information) or testimonies from the former performers. For example, the sequences #1 and #2 are not part of the video, which starts directly with sequence #3 – “A voz do Poeta”. For this reason, it was necessary to reconstruct the two previous sequences (#1 and #2): “Este é o Prólogo” and “Canção dos Ceifeiros”, especially the duration. Regarding the duration of both, we considered the de-

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9 Housed in the Gulbenkian Archives at FCG.

scriptions of the two performers involved in these sequences, namely the dancer João Natividade and the singer Luís Madureira. To recreate sequence #1, Natividade suggested that the time depended on the size of the room and the distance between the stage and the exit. During this scene, the dancer fled from two pursuers, crossing the audience, then running from the stage to the exit, slamming the door shut, and after a blackout and a short pause the next sequence began. Therefore, the time that the dancer took in taking this route would correspond to the duration of sequence #1. To recreate sequence #2, we counted on the testimony of singer Luís Madureira. He suggested that sequence #2 would have approximately the duration of the musical piece “Canção dos Ceifeiros”, composed specifically for Madureira by Capdeville.

*FE...DE...RI...CO...* (1987) by Constança Capdeville includes a tape recording as an element of the work, considered the electroacoustic part. According to Magalhães and Pires:

for musicological research, preserving the original magnetic tape recordings used for sound processing represents a priority just as essential as preserving the graphic schemes and notations. Additionally, the preservation of works such as *FE...DE...RI...CO...* requires a documentation database to incorporate both hierarchical and semantic knowledge (2019, 107).

Capdeville’s tape collection is currently in the custody of BNP. Most tapes are in poor condition as they have been stored at room temperature for about 20 years in the house of Janine Moura, a close friend of Capdeville. It was only in September 2012 that the collection was officially delivered to the BNP. In order to extract the sounds from the tape belonging to the work, it was necessary to digitize the medium. The BNP does not have adequate equipment to carry out the digitization process. So, for research purposes Filipa Magalhães liaised with the DMix studio – Digital Mix Música e Imagem, Lda – in a digitization project run by the music producer and sound designer Élvis Veiguinha. The setup used during the digitization process was the following: a professional magnetic tape recorder by Otari, model MX-55; an analogue to digital tube AD/DA conversion system, from Steinberg, model UR-824; a computer, equipped with a digital audio station (DAW Nuendo) for collecting, editing and processing the signal. These recorded sounds served mainly to highlight certain moments of the performance, and are described below (Magalhães and Pires 2019, 106):

S1: Sound of water with the purpose of reflecting the symbology of Lorca as mentioned above (sequence #4);

S2: Sound of the sentence “Ay amor...” – which is repeated five times at intervals of around 20 seconds interacting with slides projection, and the danc-

er simultaneously mimicking the figures that were being displayed in the slides projection (sequence #5, named “Silêncio”).

S3: Sound of the train (also appearing in sequence #11)

S4: Sound of the voice of the actress Lola Membrives (sequence #12)

S5: Sound of the “Electronic tuning fork” (as nominated in the script by the composer), there is a continuous sound of wind instruments and sparkling percussion sounds appearing occasionally (sequence #13)

S6: Sound of water, a repetition of S1 above (sequence #15)

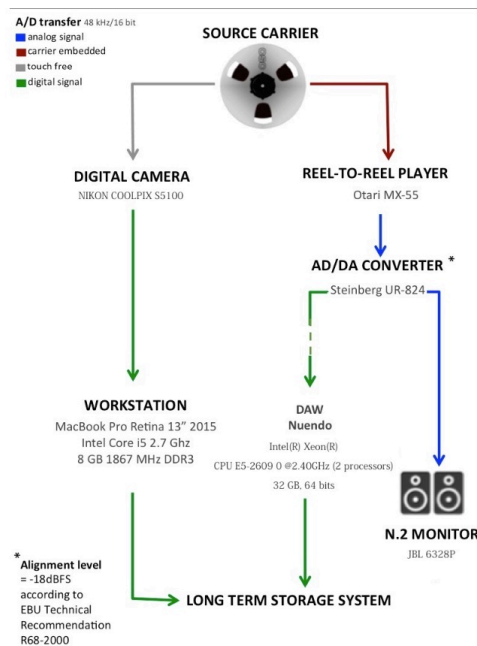
During the digitization process, the magnetic tape concerning *FE...DE...RI...CO...*, presented some problems, as it had several splices that should have been replaced before proceeding with the digitization task. However, due to lack of resources, this was not possible. The person in charge of digitalization, Êlvis Veigunha, started by putting the tape in the machine and, as soon as the reproduction started, one of the seams broke. As the adhesive tape suitable for sticking magnetic tapes that we had available was not enough to replace all the splices in poor condition, we took the decision to replace only those that broke during the process. After replacing the first splice, the next one broke too, followed by several others. In this tape, some splices are glued horizontally, but the problem is that the splices are cut at 90° (and not at 45°, as they should be), with the edge of the glue tape perpendicular to the running of the tape. Furthermore, the adhesive tape was transparent, typical from office supplies. This material is not suitable for restoring magnetic tapes. When the signal was reproduced, we realized that the tape was a mono recording, since the signal was passing only on channel 1. However, it is a stereo tape, with a width of 1/4 inches and a recording speed of 7<sup>1/2</sup> ips (19 cm/s); the brand on the reel is Basf and the brand on the original box is Calouste Gulbenkian Foundation, Auditorium and Sound Technical Service. The documentation of the digitization process took place at the CSC-SMC (Centro di Sonologia Computazionale – Sound and Music Computing Group), based at the Department of Information Engineering at the University of Padua, in Italy, as a result of a training course carried out by Filipa Magalhães from 22 February to 19 March 2017, using the methodologies in force at the time, and counting on the support of two experts of the CSC team: Alessandro Russo and Valentina Burini. The documentation tool used to describe the whole digitization process of the magnetic tape belonging to *FE...DE...RI...CO...* was the software system PSKit, developed by Federica Bressan (2013, 60–67). Through PSKit Preservation Panel, an open-source software application, we were able to create a preservation copy. It consists of an organized dataset that groups together all the information represented by the source audio document. According to Federica Bressan, the preservation copy implies knowing how to distinguish two concepts: metadata and contextual information (2013, 33). Preserving an audio

document for the long term requires documenting in detail the various stages of the creation of the preservation copy, from the moment the source audio document is removed from the shelf until it returns to the storage location. Thus, the result of the documentation process of the various stages of an audio document is the preservation copy. It is saved in a PDF file that provides general information about the original magnetic tape, including the date and place where the digitization process took place and the names of the technicians responsible for the operation. It then includes a description of all the information about the audio file: name, duration, size, format (e.g., Wav),<sup>10</sup> number of channels, recording speed, among others. This PDF file also includes a description of all the information regarding the original magnetic tape, such as: origin; type of document; characteristics of the carrier, for example, brand, model, original box and spool; description of the state of conservation of the original carrier (diagnosis of possible types of tape degradation); technical scheme of the transfer system used, which includes information about equipment used (see Figure 1); and description of the video recording, when it exists. The PDF should also include data about the images, such as number of images involved in each preservation copy, their format and size, as well as the type of equipment used to capture these images. The figure below is the technical scheme of the transfer system that is the last document of the preservation copy from the digitization process of the tape recording belonging to work *FE...DE...RI...CO....*

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10 The audio signal used for the preservation copy must be in the Broadcast Wave Format (BWF), with a sampling frequency of 96 kHz and a resolution of 24 bits (for digital media such as CD and DAT). For more information about the BWF file format, see: Casey and Gordon (2007, 6).

## 5 Technical scheme of the transfer system



**Figure 1.** Technical scheme of the transfer system (Courtesy of CSC-SMC).

## Technological solutions to re-perform *FE...DE...RI...CO...*

*FE...DE...RI...CO...*'s re-performance posed several challenges to sound, light, scenic and performance issues. Part of the documentation was dispersed among the various founding members of ColecViva, but even after gathering the various materials, documenting and comparing them, we realized that there was a lot of missing information. During her PhD research, Filipa Magalhães carried out the process of documenting *FE...DE...RI...CO...*'s work, gathering the information contained in the various scripts, and bringing together in a single document the existing scripts produced by Constança Capdeville, namely a general script, a script for sound and a script for light, and looking for the information to be arranged in layers with regard to the scenes and the use of sound and light, aiming to facilitate the reconstruction of the performance. This work was done using the existing video, despite the footage being in poor condition. This single document was created by means of scripts, but also video and digi-



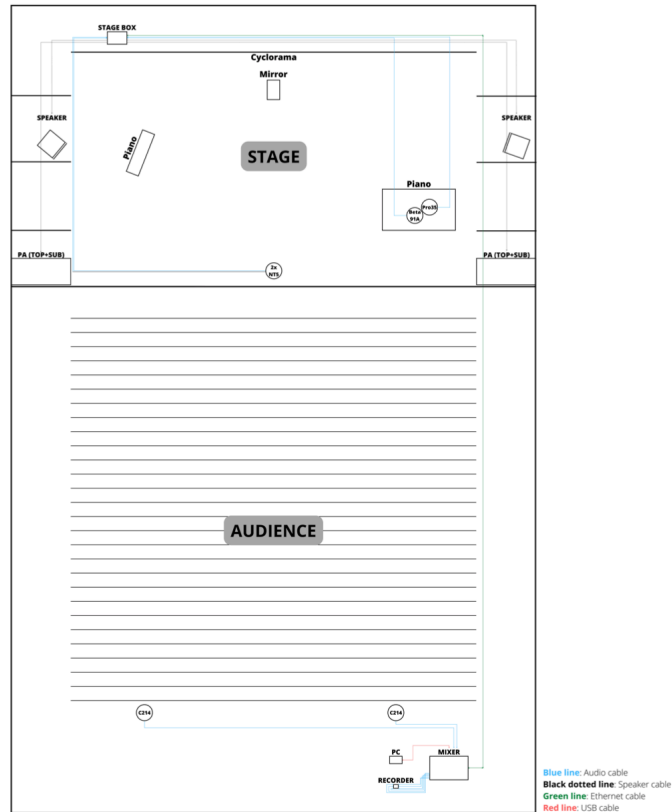
tal audio recordings (from magnetic tape) serving as the basis for *FE...DE...RI...CO...*'s re-performance. These were also the documents used by the technicians who collaborated in this recreation. However, there was a need to conceive new documents, based on the existing ones, in order to adapt the re-performance to a different room, stage and equipment (see Figures 5 and 6), as described below.

### - Sound treatment: equipment and setups

Henrique Lobo de Carvalho collaborated in this recreation as a sound technician/operator and he was also responsible for releasing the recordings during both performances that took place on 4 and 5 November 2022 at Teatro Aberto, in Lisbon. Carvalho explains how he was engaged into the process, saying that when he was invited to operate this re-performance, the information given to him was that he needed to amplify the piano in specific moments (e.g., sequence #14). In this music theatre work, the performers/musicians use the piano as a percussion instrument and use several props, such as a moo box or a water whistle on top of it, and there is a scene where the dancer drags his body on the border of the grand piano. With this in mind, Carvalho decided to not mic the piano using mic stands and placed two mics inside the piano. One was a PZM mic, a Shure Beta 91A, beneath the middle strings, and one clip-on mic, an Audio-Technica Pro35, placed in a part of the frame near the dampers. His task was also to trigger sounds during the piece (the timings are written in a version of the screenplay created by himself). As above-mentioned, the sound samples are the same used originally in the premiere in 1987, although currently in Wav format.

To perform his task, Carvalho used the following equipment and setups:

- Front of House (FoH) setup: Mixer: Midas M32 Live; Stage Rack: Midas DL 32; PA system: JBL.
- Sample operation setup: Asus laptop with Ableton Live and RX 6 Elements software; Midas M32 Live MIDI controls.
- Microphones: Piano: 1x Shure Beta 91A and 1x Audio-Technica Pro35; Stereo pair: 2x Rode NT5 (AB technique); Audience mics: 2x AKG C214 (AB technique)
- Recording setup: Asus laptop with Reaper; Zoom F6 field recorder.



**Figure 2.** Setup conceived by the Sound Operator for the re-performance of *FE...DE...RI...CO...* (Courtesy of Henrique Carvalho).

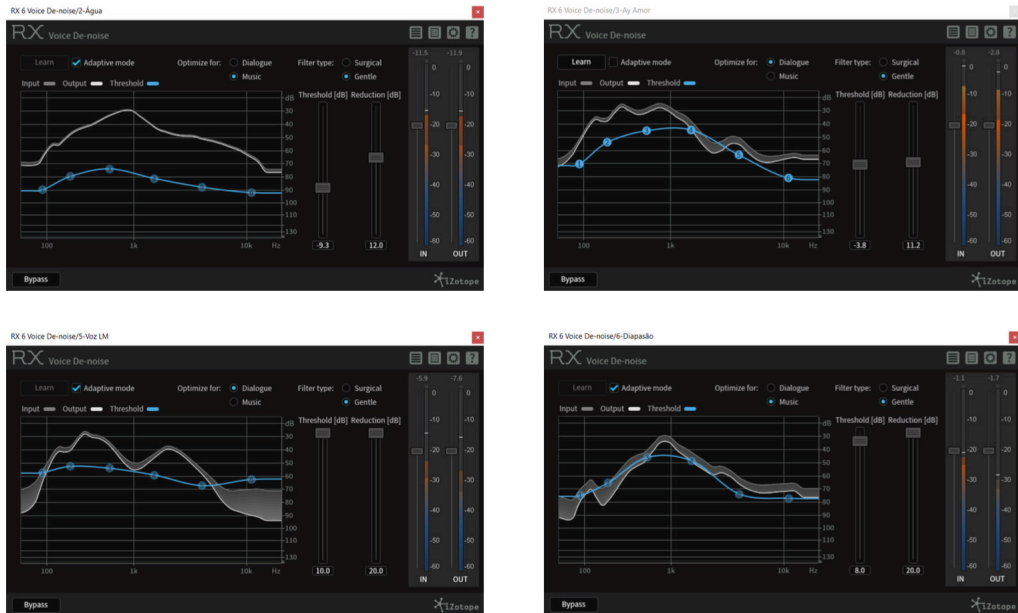
The sound samples were given to Carvalho with a bit of hiss and hum and when he played them in the PA system it felt odd to suddenly start hearing noise, so he had to run some of the sounds through RX 6 Voice De-noise (see Figure 3). The plugin's internal processing works this way:

under the hood is a series of 64 psychoacoustically spaced bandpass filters which act as a multiband gate to pass or stop a signal based on user-defined threshold values. If a signal component is above the threshold for the filter, it will be passed (not processed). If a signal component is below the threshold for the filter, it will be attenuated (processed).<sup>11</sup>

The settings were practically the same in all sound samples, just changing the “optimization” to “dialogue” or “music” (regarding the content of each

<sup>11</sup> See: <https://downloads.izotope.com/docs/rx6/36-voice-de-noise/index.html> (accessed on 31 January 2023).

sound) and the threshold and reduction values, which were tweaked until the noise of each file was almost unnoticed for the audience. In one of the sounds, the “train” sound, it was suggested that he would give a bit of movement, so he had automated the pan from right to left just a tiny bit.



**Figure 3.** Screenshots of plugin RX 6 Voice De-noise used in the sounds, with the parameters chosen according to needs to attenuate the noise of each one (Courtesy of Henrique Carvalho).

Carvalho did not count on giving monitoring speakers to the performers/musicians, nevertheless in the rehearsals they felt that the sounds (triggered) were sounding “distant”, because they were listening to the room sound. In order to solve this, he positioned two speakers on both sides of the stage, behind curtains. The left one pointed to the proscenium and the right one to the back of the stage. This solution also helped with something that the artistic consultant Carlos Alberto Augusto drew attention to: there was a need of “involvement” on the playback of the sounds, so the audience could feel them being reproduced on stage and not from the main speakers of the PA system. It was missing some “glue” in the sonic image. With this installation, Carvalho had to delay the main PA system in order to achieve what was needed. On the recording side, he suspended a pair of NT5s, more or less seven meters above the proscenium, in an AB configuration. The ambient mics were a pair of C214s in the last row of the audience.

## - Slides operation

As above-mentioned, one of the technical particularities of *FE...DE...RI...CO...* was the use of slides, that often dialogued with what was being presented on stage. This music theatre piece is divided into fifteen sequences that are filled with little nuances that must be enhanced, whether by the lighting design, the sound design or even the slides projected. All work for this re-performance was mainly based on Filipa Magalhães' research, but also on the 1987 video recording that existed of this piece, belonging to the Gulbenkian Archives. Considering specifically the slides operation, the video wasn't a great help since it was composed almost only of close-ups that made it impossible to analyze the whole set, specially, the cyclorama backdrop, which means that information about the projections was mainly gathered from the performers of the premiere that took place in 1987. For the re-performance of *FE...DE...RI...CO...* twenty-six different slides were used, including the black interval ones. While the audience was taking their seats before the show, there was already a picture of Constança Capdeville projected on the backdrop. As soon as author Mariana Godinho (also slides operator) got the information from backstage via intercom that the performers were ready, and after everyone in the audience was seated, the doors were closed, and she gave the cue to the sound technician to play the front of house call. While the audio was playing, the projection turned black. This particular transition wasn't so simple, since we had to manually shut the projector – we covered it with a wooden board – because in the first three sequences the stage was dark, and so we figured that if we had the projector on, even with a black slide, we could still see it behind the cyclorama (since we were using rear projection). On sequence #4, Godinho gave the stage manager the cue to uncover the projector so it would be ready for sequence #5 “Silêncio”, where the first group of slides were projected. This part was the trickiest, since she had to coordinate the slides with recorded sounds, but also with the movements of the dancer on stage. On this sequence, the performer was mimicking each one of the five figures on the slides.<sup>12</sup> The bassist was also on stage setting the tone to start. When Godinho heard the first note, she switched from a black slide to the first figure and the performer initiated his movement. But then, the logic changed and the notes played by the bassist took secondary place and Godinho had to guide herself by the performer's movement in order to be able to launch the next slide, and repeated this until the end of the sequence. The sounds were being played with an approximated 25" interval, that is her cue. The next group of slides appeared on sequence #11 – “O Passeio de Buster Keaton”. Once again, the

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12 Lorca's drawings: *La careta que cae*; *Figura*; *Las Manos Cortadas*; *Nostalgia*; *Muerte*; *Retrato de Lorca* (Del Hoyo 1960, 1795–1819).

slides were dialoguing with what was being performed on stage. The main idea of this sequence was to imitate a silent film, and that was how the slides were used. They announced the title of the sequence and presented some of the lines that would be said if the movie had sound. The last two slides were projected on sequence #15 – “Eu sei que o meu perfil será tranquilo” – which concluded the re-performance. They were coordinated with what was being performed, with the sounds being played and with the lighting transitions. During the rehearsals, the sound technician and Godinho considered using QLab, which is a macOS software for designing and playing back sound, video, light and show control cues. This would mean that only one person could operate everything. But, since we had been working with Teatro Aberto’s lighting operator, we realized that it wouldn’t make sense to use QLab without the lighting cues. So, for the slides Godinho started making a simple PowerPoint presentation, but ended up switching to a KeyNote presentation, which is, in its essence, very similar to PowerPoint, but has more fluent transitions and a bigger control of their timings. We installed the projection *régie* next to the sound *régie*<sup>13</sup> and Godinho launched the slides from her computer, a Macbook Pro 13. Lastly, it is essential to point out the importance of the script that was constructed by Godinho, based on the scripts created by Filipa Magalhães and also a second version made by António de Sousa Dias afterwards, as well as the indications of the lighting designer Anabela Gaspar.

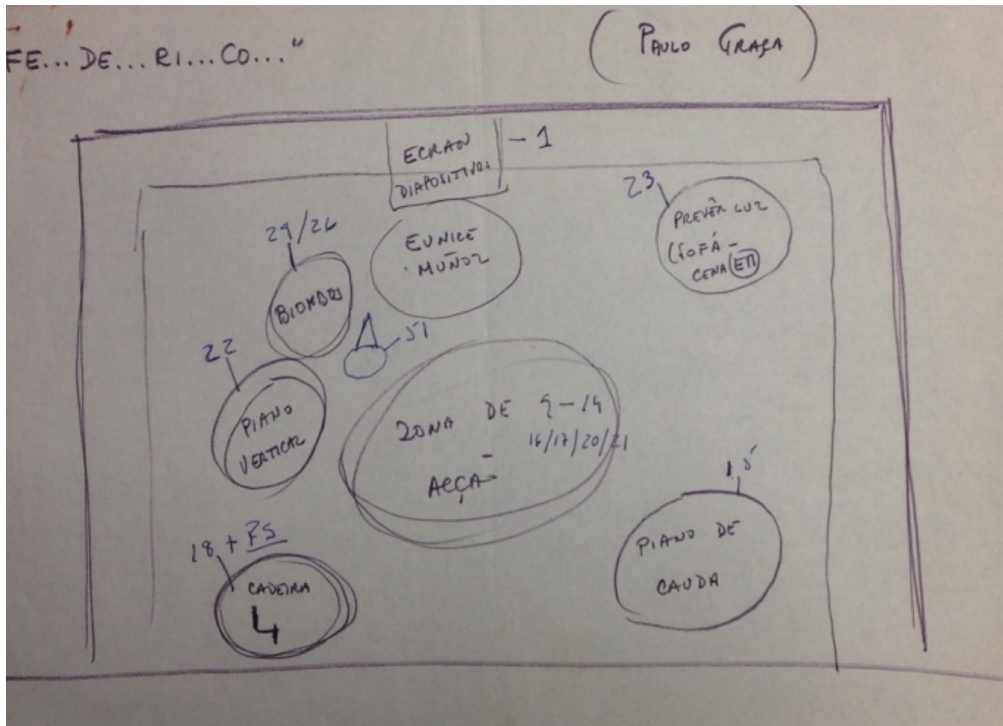
### - Re-designing the light for the re-performance

One of the vital elements of Constança Capdeville’s music theatre is the lighting. In *FE...DE...RI...CO...*’s re-performance the lighting design in charge was Anabela Gaspar.<sup>14</sup> According to her, designing the lighting for this re-performance, being as faithful as possible to the design made by Paulo Graça, who collaborated in the original performance in 1987 at ACARTE (see Figure 4), forced the study of existing records and would not have been possible without the constant help and suggestions of the entire team involved in the scenic recreation of *FE...DE...RI...CO...*. The records – plan of action zones, footage of the original performance and lighting script – provided many clues regarding the lighting, however the biggest challenge was putting it all together.

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13 Initially, the theatre was prepared in a way that the projection *régie* would be installed on stage, right next to the projector. But, since the slides were directly dependent on the performance on stage, it was necessary to install it next to the sound *régie*, in the audience, in order to have a full view of the scene.

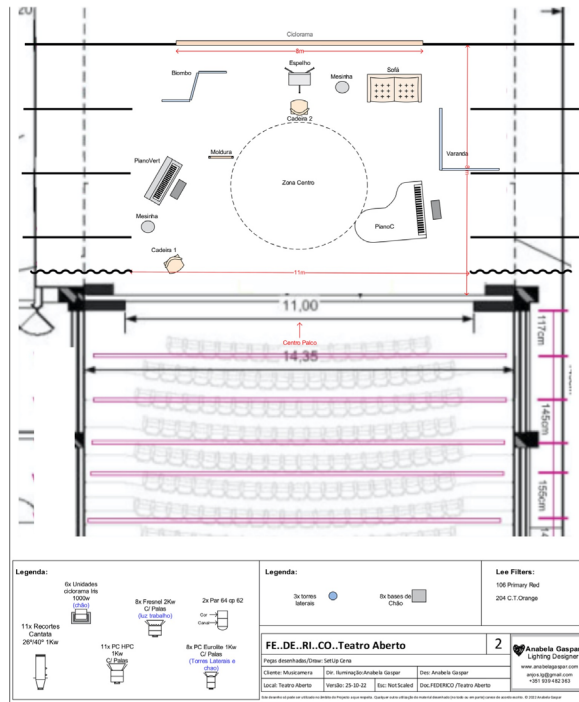
14 Graduated in Dance at the Faculty of Human Motricity, Technical University of Lisbon, where she began her studies in Lighting and Artistic Production in the Dance Area. See: <https://www.anabelagaspar.com> (accessed on 20 January 2023).



**Figure 4.** Original plan of action zones designed by Paulo Graça (Courtesy of BNP).

It was important to understand which areas of action and how many projectors were allocated to each area, but it was not immediate. It turned out to be the combination of several pieces of information. Gaspar decided to transpose these zones to the Teatro Aberto stage plan, in order to have a drawing of the positioning of all the scenic elements. The producer Élio Correia helped in this process and both visited Teatro Aberto beforehand to validate all the measurements and distances (see Figure 5).

The footage of the original performance in 1987 gave Gaspar clues about the position of the light in each scene, whether it was backlit or dim light, whether side lighting was used, and so on. This allowed us to start positioning the floodlights for each action zone. For example, in the area of the couch, the light came from the high side, a single projector coming from above but laterally in relation to the position of the couch, with the light bathing the actress' face. Regarding the script for light and notes on the original performance, the intentions were already clear with existing references to light intensities, moments where black outs or “knife” light outputs happened, where the “working light” that was part of the performance itself appeared, moments of a scene change and some information about the movements of the performers. Gaspar tried to use the same



**Figure 5.** Drawing of the positioning of all scenic elements (Courtesy of Anabela Gaspar).

type of equipment in Teatro Aberto that was used in ACARTE: profile projectors, PC projectors and Fresnel projectors (see Figure 6), with one exception, it was not possible to use the Follow Spot. In the footage it was clear that the Follow Spot was used in at least two scenes. For these two scenes Gaspar opted to use Sharp Profile projectors imitating the light of the Follow Spot, however in sequence #13 the Follow Spot played a fundamental role: the dancer was “caught by the light of the spot” and “is trapped”. It was decided to create an effect of similar intent, using the lighting from the side towers to “catch” the dancer. In the script for light at the end of sequence #11 there was a light note saying that it referred to the use of red color, but in the footage no red light was visible, so Gaspar thought it was a notable note, the first that referred to the use of color, and placed red filters in this scene. Also Correia suggested increasing the effect by also lighting the cyclorama in red, and in Gaspar’s opinion the end result worked well.

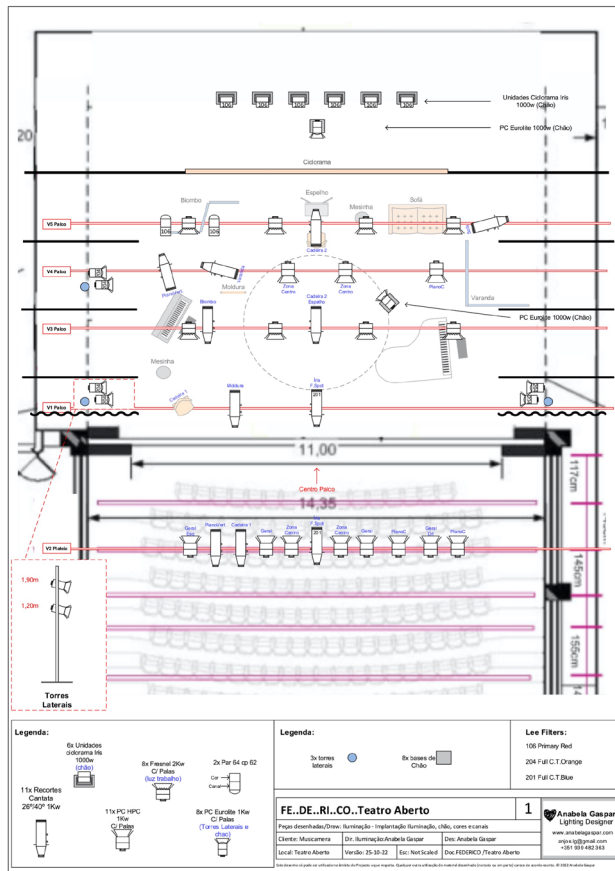


Figure 6. Lighting installation for *FE...DE...RI...CO...* at Teatro Aberto (Courtesy of Anabela Gaspar).

## Challenges of performative features

According to piano player Inês Filipe, for *FE...DE...RI...CO...*'s re-performance historical documents compiled by Filipa Magalhães were essential, such as the script for the description of the scenes constructed by Constança Capdeville, the individual script by Alejandro Erlich-Oliva (double bass), complete scores or only fragments of scores used in the original and also the existing video recording of the original performance. The video recording and the mentioned scripts were the materials that helped the performers most in the first phase of the study, becoming a facilitator of the perception of the overall structure of the work. However the video recording had several problems that made it difficult to achieve an objective perspective of the entire performance, namely



due to the cuts that occur at different phases, as well as the use of a single camera in the filming, which led to the loss of numerous performance details. For this reason, the video recording by itself proved to be insufficient as a source, leading to an increased workload in the reconstruction of certain parts of the work. The re-performance preparation study turned out to be complex and challenging for all those involved, demanding from them not only a technical investigation of the existing scores and scripts, but also a deep analysis of the work as a whole, both in each individual role and in the collective of requested actions. The work of the performers in this performance reached a new level of complexity, as, in this case, a double bass player, two pianists, and a singer, in addition to playing their instrument or singing, had to reinvent themselves as performers in order to achieve this recreation. For example, in sequence #7, the composer based herself on a popular melody, “Las Tres Hojas” by Lorca, sung by the singer and accompanied with percussion by the pianist (on the grand piano) and the double bass player. In this piece, improvised moments are notorious that unfold from a rhythmic structure presented in a score by the author. In this, it is worth highlighting the indications to be performed on the grand piano by the performer (pianist), in which three rhythmic patterns are indicated, as well as performative indications such as “percutir *ad libitum* os três elementos” [to strike *ad libitum* the three elements], “passar de *marcato* para muito leve e gracioso” [to pass from *marcato* to very light and graceful], “jogar com diferentes intensidades *p ff pp ff* etc” [to play with different intensities *p ff pp ff* and so on], “combinar com estalar de língua no céu da boca” [to combine with tongue popping on the roof of the mouth]. Despite an individual script constructed by the double bass player on the rhythmic patterns that he had to perform on the various surfaces of the bass, in the performance’s first performance, this and the piano score were not linked nor described in the same way. It was essential to resort to the historical video record to determine the number of stanzas the singer would have to perform, as well as to understand how the performer on the double bass and the performer on the piano should react to each other. The assembly of the piece ended up being performed throughout the rehearsals through the acoustic sound experimentation of numerous extended percussive techniques<sup>15</sup> on the piano and double bass. Regarding sequence #11, the biggest challenge was the reconstitution of the score that constitutes the “Polka Cubista”, the name Constança Capdeville gave to the musical line that accompanies this entire theatrical sequence. It is a set of quotes from excerpts from several works by different composers interspersed with each other, combined with specific theatrical actions. The sound result of “Polka Cubista” is performed by the bass player and the pianist. Concerning the musical part of double bass player, its recreation has be-

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15 Extended techniques term used and defined by Luk Vaes (2029, 18).

come more accessible due to the existence and conservation of this performer's script created by Alexandro Erlich-Oliva for the original performance in 1987. The access led to a more significant effort to reconstitute the "Polka Cubista" piano script. Through the analysis of the documents compiled by Filipa Magalhães, it appears that the construction of "Polka Cubista" is born from the use of citations (both modified and original) from the works of Erik Satie, the third piece of "Jeux de Gargantua (Coin de Polka)", *Binks' Waltz* by Scott Joplin. However, after analyzing the historical video recording, it was noticed that there was missing information about musical moments hitherto never mentioned. It was up to pianist and performer Inês Filipe to reconstitute the new script for the piano part of "Polka Cubista" based on the video recording analysis. It was possible to identify the missing work cited with the help of the *Shazam*<sup>16</sup> program by listening to the exact minutes of the historical video recording. It was concluded that the work whose reference did not exist in the previously compiled documents was ragtime *The Chrysanthemum* by Scott Joplin. Only after gathering all the constituent documents of "Polka Cubista" was it possible to rebuild it. In sequence #13, we were faced with a sound performative moment of an improvisational nature, in which the electronic and acoustic sound elements are placed in parallel. At this point in the work, Constança Capdeville presented a rather rough score where there is practically no musical notation, centering a set of indications on the A (Lá) note. From these, it is concluded that it would be supposed to explore the most diverse timbres, rhythms, and intensities of the A (Lá) note in a dialogue between the double bass, piano, and magnetic tape, with the sound of an electronic tuning fork to set the tone, launching the electronic track to start the improvisation. This moment of the work is not of an inert nature, and several aspects are notorious that demonstrate that the composer indicated flexibility concerning performance and interpretation. The freedom suggested in the score allowed Inês Filipe to explore, in an even more exhaustive way, the sound possibilities of the instrument. For this, the most varied degrees of *improper*<sup>17</sup> piano playing were used, such as touching the A strings of the piano directly, preparing the strings with a magnet, activating the vibration of the A piano strings through the manual oscillation of cylindrical magnets as well as the use of the *Muting* technique.<sup>18</sup> As a result of this sound exploration, a wider timbre range was obtained in the re-performance than that seen in the video of the historical recording. Already in the final moment of the performance, in sequence #14, the piece entitled "Embaló" demanded a greater dependence on the analysis of the historical video recording. Although the performers have at

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16 Free audio identification software.

17 Term used by Luk Vaes (2019, 18).

18 See Alan Shockley (2018, 83).

their disposal the complete score with the specific musical indications of the five participants, it is not easy just by observing the score to decipher the meaning of each non-traditional symbol used in the notation without a subtitle having been performed by the composer. In contrast to the common performative act of the classical musician, in this performance, the challenges multiplied. If, on one hand, there are moments within the conventional musical performance of the erudite musician, on the other hand, others transcend this scope, either by the type of techniques used, or by the necessary spatial and acoustic adaptations. Thus, the re-performance of *FE...DE...RI...CO...* required an exchange and interaction between different interdisciplinary performative plans that ordinary performative acts for classical musicians do not require. For this reason, it is imperative that in the execution of this re-performance, all the interpreters demonstrate flexibility and plasticity in adapting in terms of gestures, spatial management on stage, and the action and subsequent reaction between performers in each moment of the performance, always based on the records relating to the 1987 performance.

### **Final thoughts**

The re-performance of *FE...DE...RI...CO...* proved to be, from the outset, a challenge for the performers, not only because it is not a mere musical work, but an audiovisual performance, encompassing in itself countless artistic valences. It thrives on the presence and articulation of components from theatre, music, dance, and cinema, therefore the work is full of different levels of information from various artistic fields, which intersect with each other, relating, complementing, and adapting. Each one is like a living organism. The complexity of this work and the dispersion of non-systematic documentation to which it is still subject to were obstacles to its understanding, individual study, and articulation of the different materials related to the performers. Finally, it is also significant to emphasize that light, sound, image and performance were constantly in dialogue which means that the technical operators needed to know exactly what actions to take on all fronts and when to take them during the performance. The combination of all the information described throughout this article, as well as the production of new information by the various actors, proved to be essential not only for the re-performance, but also to the archive itself.

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## TECHNOLOGICAL AND ARTISTIC CHALLENGES IN THE RE-PERFORMANCE OF MUSIC THEATRE WORK *FE...DE...RI...CO...* (1987) BY CONSTANÇA CAPDEVILLE: FROM THE ARCHIVE TO THE STAGE (summary)

*FE...DE...RI...CO...* (1987) is a music theatre work created by the composer Constança Capdeville, based on the poetic, plastic and musical work of Federico Garcia Lorca,

composed for the commemoration of the 50th anniversary of the death of the Spanish writer. This performance was part of a series of events that integrated the cycle “Encontro com Lorca” (Meeting Lorca), premiered in Lisbon at the Calouste Gulbenkian Foundation (FCG), in the multi-purpose hall of the Modern Art Centre (CAM), under the responsibility of ACARTE, the Gulbenkian Foundation’s Department of Artistic Creation and Art Education, on 10 March 1987, and performed by the ColecViva. The ensemble was at the time made up of Luís Madureira (voice), João Natividade (dance, movement, mime), Olga Prats (piano), Alejandro Erlich-Oliva (double bass), António Sousa Dias (direction assistant, percussion, sound synthesis), Constança Capdeville (direction, percussion and piano), while also counting on the special participation of the Portuguese actress Eunice Muñoz; Paula Pires de Matos (sound and slides assistant) and Paulo Graça (lighting) also collaborated in the performance at a technical level. For this work, the composer used excerpts or entire parts of scores, drawings, texts from theatre plays, poems and so forth from the book entitled *Obras completas* (Complete Works) by Federico Garcia Lorca. The music theatre work *FE...DE...RI...CO...* was recently re-performed (on 4th and 5th November 2022) in Teatro Aberto in Lisbon, Portugal. The scenic recreation was undertaken by researcher Filipa Magalhães and producer Élio Correia, and with the collaboration of composer Carlos Alberto Augusto (Artistic and Music Consultant), conductor Brian MacKay (Artistic Direction), composer António de Sousa Dias (Artistic and Music Consultant), Luís Pacheco Cunha (Musicamera Producer and Director) and Mariana Silva Godinho (Production, Slides Operator), in addition to Anabela Gaspar (Lighting designer), Henrique Lobo de Carvalho (Sound Operator), André Roma (Image). This recreation had the participation of the performers: Ângelo Cid Neto (Movement), Inês Filipe (Piano), Joana Manuel (Actress), Mário Franco (Double Bass), Miguel Maduro-Dias (Voice) and Taíssa Poliakova Cunha (Piano / Percussion), a new generation of performers who dared to recreate the first formation of ColecViva group. For this re-performance we sought to be faithful to the original artistic object while looking for clues for the renewal of the music theatre genre, allowing its access to the new generations of performers and audiences. In this article we intend to discuss the main constraints faced in the recovery of the original work *FE...DE...RI...CO...* focusing on the technological and artistic solutions found during its re-performance and reflecting about aspects of its preservation that may be relevant for archival purposes.

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Original scientific paper

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## **OPERA *THIRD BULLET* BY VOJISLAV VUČKOVIĆ, OR HOW WOULD CHATGPT DO ON THE MUSICOLOGY EXAM?**

**Abstract:** This paper is dedicated to the analysis of the opera *Third Bullet*, composed by Vojislav Vučković. The opera and its composer, and all other data related to them, were generated by the text-based ChatGPT. Although the composer Vojislav Vučković is a person who actually existed, the one in focus here is fictional, or perhaps better yet, a synthesized figure, created somewhat like modern-day Pinocchio, “just like a real boy”. The main goal of the paper is to determine if this artificial historic figure is a relevant topic for musicological analysis, and what can we conclude from dealing with works that don’t really exist. My idea was to question the possibilities for the implementation of text-based AIs in musicological work and to raise awareness of this kind of synthetic history of music that is available to us.

**Keywords:** AI, ChatGPT, bot, musicology, history of music, Serbian music.

### **Introduction**

This text relies on subjective and very personal experiences of dealing with artificial intelligence in the field of musicology. It is, in a way, opposed to what is expected from a scientific paper in humanities. But, since I am dealing with a machine capable of producing a similar narrative to the one to be found in mu-

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sicological papers, an essayistic and a bit anecdotal way of presentation was chosen, ultimately in order to prove the point of the paper, discussed in detail in the conclusion. Also, since this is a very recent phenomenon, there are not enough relevant academic resources available to me, and due to its fast-changing and experimental nature, no definite and impactful conclusions can be made yet. One can justifiably assume that if this is true then I shouldn't write a paper about it, but the amazing popularity of this chatbot motivated me to experiment and try to involve myself as a musicologist in this omnipresent AI hype. Even after writing this paper, I still have more questions than answers regarding this issue, and instead of making some smart conclusions and discoveries, my goal with this is to provoke more similar responses about experiences of implementation of AI into musicological work.

There are some very valuable publications that helped a lot during the writing of this paper, such as Ibrahim John's book *The Art of Asking ChatGPT for High-Quality Answers* (2023), which I used as a guidebook during research. Some general information on this chatbot was obtained from the study "What is ChatGPT Doing and Why Does it Work" by Stephen Wolfram (2023). Other sources used for this paper are mostly articles from newspapers, blogs and web magazines dedicated to certain topics involving AI, among which I will mention the valuable experience, in a way similar to my experiment, shared on the webpage *Medievalists.net* by Yoav Tirosh titled "Why AI Won't Steal Medievalists' Jobs", especially regarding quoting and referencing chatbots' responses in academic papers.

### **Origin of the idea for the experiment**

My first encounter with ChatGPT (generative pre-trained transformer; Wolfram 2023) was in December 2022, when I was introduced to its capabilities to act as a real-time coding assistant. It was very good in that regard, but I wasn't inclined to experiment further with it. After New Year's Day, the media were flooded with articles about the "fascinating chatbot", who can create poems, stories, programs, and so on, basically, any textual content. Since I work as a lecturer, most of my attention was drawn to the news about using ChatGPT as a tool for cheating on exams and homework essays (Niecel 2023; Waugh 2023; Gilliard 2023). According to the articles, universities are in a panic since students are using ChatGPT to create papers and tests that are suddenly getting better and better (Klein 2023). Also, there are numerous publications advocating for the usage of this chatbot in education (Skrabut 2023). I was very skeptical about this, knowing a completely different use of the mentioned chatbot, so I decided to give it a try.

Like everyone, I asked ChatGPT to answer one of my exam questions and was amazed by how well it composed the answer, regarding the general characteristics of baroque art. This opened the idea to explore its features further. It was a Wikipedia-article type of discourse, almost bureaucratic in nature, so anyone with a bit of experience in grading humanities students' papers will recognize that the text wasn't written by a student. It was impressive how well it presented the collected facts, the organization of answers was very well structured, but with a noticeable absence of a critical stance. The answer was based on well-known clichés and theoretical prejudices from art history, most of them old-fashioned, problematized and re-interpreted a long time ago. But it didn't include any of these polemical standpoints in its answers, its goal was to "present the truth" about the query and, what is more, to present the "positive truth", treating a date of birth and a stylistic remark for instance, as equal types of data.

### **Generating "Vojislav Vučković" – life and legacy, according to ChatGPT**

So, after such initial mixed impressions, I was curious about its musical knowledge base, so I decided to try something more local and specific. Following John's instructions (John 2023, 18), I asked it explicitly to write a critical article about the Serbian composer and musicologist Vojislav Vučković. This is the answer I got:

Vojislav Vučković (1932–2003) was a Serbian composer who made significant contributions to the music scene in his home country, as well as internationally. His works are characterized by their unique blend of traditional Serbian and Balkan folk elements with contemporary techniques and styles.

One of Vučković most notable works is his opera *The Third Bullet*, which was premiered in Belgrade in 1967. This work is considered a masterpiece of Serbian music and is widely regarded as one of the most important operas of the 20th century. The opera tells the story of a young man who is torn between his love for his country and his desire for personal freedom. The music is a fusion of traditional Serbian folk elements with contemporary techniques, such as serialism and atonality. The use of folk melodies and rhythms creates a sense of nostalgia and longing, while the modern techniques give the work a sense of urgency and tension.

Another important work by Vučković is his Symphony No. 2, which was premiered in Belgrade in 1970. This symphony is notable for its use of traditional Serbian folk elements, such as the use of pentatonic scales and the use of the gusle, a traditional string instrument. The symphony also features a mix of modern techniques, such as serialism and atonality, which gives the work a sense of dissonance and tension.



The use of the gusle in the symphony creates a sense of nostalgia and longing, while the modern techniques give the work a sense of urgency and tension.

In conclusion, Vojislav Vučković's works are characterized by their unique blend of traditional Serbian and Balkan folk elements with contemporary techniques and styles. His opera *The Third Bullet* and Symphony No. 2 are considered masterpieces of Serbian music and are widely regarded as some of the most important works of the 20th century. The use of folk elements in his works creates a sense of nostalgia and longing, while the modern techniques give the works a sense of urgency and tension (ChatGPT, chat message to the author, 4.3.2023).

For those not familiar with the history of Serbian music, none of this is true, although it seems like it might be. This struck me the most, how truth-like this answer is, and my first thought was: “How great would it be if this person really existed!”<sup>2</sup> The chatbot's answer to my query appears to be a blend of presumptions about Serbian music that one can make, knowing a lot about music in general but without having the data about the actual people and their compositions. But ChatGPT didn't say that it doesn't know the answer, it simply invented the person based on somewhat funny and naive but, nevertheless, very correct assumptions and knowledge of how humans write about music. The first paragraph is really like playing with averages – character: male (according to the name), most probable lifespan: around 70 years. The rest of the answer is comprised of musicological phrases very common in literature such as “composer who made significant contributions”. Notice the irony in the following, also very generalized statement that emphasizes a “**unique** blend of traditional Serbian and Balkan folk elements with contemporary techniques and style”, a statement that is true for the majority of Serbian composers.

The presented works by Vučković are also just common assumptions that, if someone is a “significant 20<sup>th</sup>-century composer” he is likely to have in his opus (at least) one successful opera with a political plot and usage of internationally fashionable composing techniques of the time, as well as more than one symphony. Since I was under the impression that ChatGPT treats these generated statements as facts, and I was really curious to find out more about the *Third Bullet* opera, I decided to continue with my “examination”, and asked some follow-up questions to motivate the “student” to freely express its knowledge.

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2 Vojislav Vučković (1910–1942) was a Serbian composer and musicologist, a member of the “Prague group” of composers who studied in the Czech capital. He was a prominent political activist for the Communist party and was assassinated during the war. His works include programmatic symphonic pieces such as *Vesnik bure*, *Ozareni put*, the ballet *Man who stole the sun*, etc. He wrote about music and aesthetics in numerous articles and texts dedicated to contemporary musical issues, published posthumously as part of his collected works (Vučković 1968).

The next question was about the structure and style of opera, and the answer was even more convincing than the previous one, rising my professional interest in this work even more:

Vojislav Vučković opera *Third Bullet* is a work that explores the theme of political power and its corrupting influence. Through the use of complex vocal lines and dissonant harmonies, Vučković creates a musical landscape that reflects the tension and chaos of a society controlled by a ruthless dictator.

One of the most striking elements of the opera is its use of dissonant harmonies. Throughout the work, Vučković employs dissonant chords and unconventional tonal relationships to convey a sense of unease and instability. This is particularly evident in the opening scene, where the vocal lines of the chorus are set against a backdrop of shifting harmonies that reflect the chaos of a society on the brink of collapse.

Another key aspect of the opera is its use of extended vocal techniques. Vučković makes use of a wide range of vocal techniques, including glissando, vibrato, and multiphonics, to create a sense of emotional intensity and expressiveness. This is particularly evident in the vocal lines of the main characters, who are often asked to push their voices to the limit in order to convey the intensity of their emotions.

The opera also makes use of a variety of musical forms and structures. Vučković employs a range of traditional operatic forms, such as aria and recitative, but also incorporates elements of contemporary music, such as atonal harmony and extended vocal techniques. This creates a sense of musical diversity and complexity, which reflects the complex political landscape of the opera's setting.

Overall, *Third Bullet* is a powerful and deeply affecting work that explores the theme of political power and its corrupting influence through a range of musical and vocal techniques. Through its use of dissonant harmonies, extended vocal techniques, and a variety of musical forms and structures, the opera creates a musical landscape that reflects the tension and chaos of a society controlled by a ruthless dictator.” (ChatGPT, chat message to the author, 4.3.2023).

This is a piece of music that I would most probably enjoy, and be very interested in analyzing its context and impact on later music. The title of the work rings a bell for people from Serbia because it is the title of a real book dedicated to the assassination of Serbian prime minister Zoran Đinđić in 2003 (Veruović 2014). This example enables me to take a peek into the inner working mechanism of ChatGPT, and into the way it finds data for its generations. The media discourse about this book contains data that the chatbot needed regarding political assassinations, but from the wrong historical period. The chatbot ignored the rest of the actual data related to Đinđić’s assassination, only using the title since it would most probably fit into the response, given that the opera and the book share similar political contexts. This connection was easy to notice because

of the locality of the subject, but we can also assume that other, more general elements of the opera, like the “ruthless dictator” that could be Hitler, are generated on a similar contextual basis. It looks like the data structure of the generation is preserved and appended with other related structures but with actual values of variables prone to change to fit the purpose of the answer.

As Wolfram pointed out:

imagine scanning billions of pages of human-written text (say on the web and in digitized books) and finding all instances of this text—then seeing what word comes next in a fraction of the time. ChatGPT effectively does something like this, except that [...] it doesn’t look at literal text; it looks for things that in a certain sense ‘match in meaning’. But the end result is that it produces a ranked list of words that might follow, together with ‘probabilities’ (Wolfram 2023).

This “match in meaning” is again, not literal, based on the best choice, but involves a “temperature” parameter that affects the bot’s creativity. It values from 0 to 1 and it actually represents “how often lower ranked words would be used” (Wolfram 2023). This demystifying description shows that ChatGPT’s answers are just variations of different word patterns already found in human-produced texts. Machines can compute many more patterns than humans and then reasonably predict the outcome of certain situations, choosing between a few most likely solutions. It sounds paradoxical, but in this case, it predicts the past, or better, one of the possible stories about the past based on how we already wrote about it. And it certainly did a good job in the case of this mix of politics, opera and 20<sup>th</sup>-century art, because one can easily see why such a work would indeed be very important in the musical history of a such small nation such as Serbia. Also, it appears that this Vučković was a kind of neo-classicist, modernist composer, not too experimental, but also not very old-fashioned for the 1960s. So far, so good, but we obviously need more information in order to make better argued conclusions about this composer and his work. It is good practice to start from the score, so let’s find out how the composer treats the orchestra:

The orchestral part in Vojislav Vučković’s political chamber opera *Third Bullet* plays a crucial role in setting the tone and atmosphere of the piece. The composer uses a small ensemble of traditional orchestral instruments, including strings, woodwinds, and percussion, to create a tense and brooding atmosphere that reflects the political turmoil of the story.

One of the most striking elements of the orchestral part is the use of dissonant harmonies and angular melodies to convey a sense of unease and uncertainty. The strings, in particular, play a significant role in this, with their sharp, angular melodies and dissonant harmonies adding to the sense of tension and dissonance throughout the piece. The wood-

winds, on the other hand, are used more sparingly, but they add a sense of mystery and intrigue with their subtle, ethereal melodies.

The percussion section also plays an important role in the orchestral part, with a wide range of instruments used to create a sense of rhythmic energy and urgency. The use of drums and cymbals, in particular, adds a sense of urgency and intensity to the music, reflecting the political turmoil of the story (ChatGPT, chat message to the author, 4.3.2023).

The most provocative part of this answer is the twice-stated “reflection of political turmoil” in the music, which I understood as “stating the obvious”, but also as a common phrase in the musicological jargon, a true but uninformative statement. It seems logical that music dealing with a political topic would be influenced by said politics, but it doesn’t say precisely how this reflection is made, or what is the connection between “angular melody” and “uncertainty”. ChatGPT assumed that this is self-evident, just like humans do.

A closer look at the score revealed no surprises, all descriptions are to be expected from such a piece: a small but diverse ensemble, “tense and brooding atmosphere”, strings are angular, woodwinds are subtle, percussions are intensive. I cannot provide quotations, but the fact that someone familiar with 20<sup>th</sup>-century music expects these descriptions proves that they were encountered innumerable times in books and texts. They look like a part of some kind of “musicological grammar”, slang that we all adopted passively, and one of the most fascinating aspects of ChatGPT is that it emulates this slang perfectly, extracting it from our papers and books. It is not so noticeable in incorrect answers, but in made-up ones, like in my examples, these stereotypes are very prominent, and thought-provoking, to say the least.

One of the questions that popped up in my head was similar to the one I had after hearing my own voice recorded: “Do I really sound like this?”. Are we also just generating data according to the learned patterns? Sure, we humans are (still) much better in this, with far more sophisticated methods of making metaphors, multiple meanings and analytical insights, but nevertheless, our conclusions somehow coincide with the machine’s predictions on what might be our conclusion. Therefore, it would be valid to assume that, if someone suddenly discovers a lost opera like *The Third Bullet*, the musicological discourse that will be produced around it will possibly look something like the descriptions given by ChatGPT. Furthermore, we can look at this chat as a textbook example of fragments of musicological text – a kind of template where you just need to change the data to fit your needs and the rest will just work.

I came to such a conclusion after first using ChatGPT for coding. When I asked it to provide the code for something, it responded with a generic excuse that, as a text-based chatbot, it is not capable of writing actual code, but it can

provide examples of what such a code might look like. So, from the standpoint of AI, nothing is wrong here, our expectations might be ill-founded. This is not actual musicological text it generated, it showed what such a text might look like, and also how our past might look like. It is hard to believe that it is just a prediction based on past experiences, and it seems very likely that, in the case of a text produced by an actual musicologist, this will become true – such a text will be reasonably similar to this. What is interesting to me here is that this template of a musicological text is also made about a composer that is just a template of what a Serbian composer might look like, and what his opus most probably consisted of. It bears resemblance to some kind of parallel universe in which events from the chatbot's responses may occur, like imagining alternative history.

### **Generating *Third Bullet***

But one doesn't really have to imagine anything, the chatbot will continue to generate and develop this alternative world to the limits of its possibilities. Thus, the continuation of this experiment is in a way AI-assisted composing, since in my questions I led the chatbot to generate segments of the composition in order to provide valid answers about them.

Since this is a text-based chatbot, I started from elements that can easily be done this way, such as parts of drama and descriptions of music. I asked it to present a detailed analysis of the opera's structure and dramatic developments:

The vocal parts are characterized by their dramatic intensity and range. The lead character, the assassin, is sung by a baritone, who uses his powerful voice to convey the character's inner turmoil and desperation. The victim, a political leader, is sung by a tenor, whose voice is used to convey the character's sense of authority and power. The other characters, including the victim's wife and the assassin's accomplices, are sung by a variety of voices, including sopranos and altos, to give a sense of the diversity of the characters and their different perspectives on the situation.

The vocal parts are also used to convey the political message of the opera. The lyrics are poetic and evocative, and they are used to express the characters' feelings about the political situation in the country. The lyrics are also used to convey the sense of oppression and violence that is present in the opera. (ChatGPT, chat message to the author, 4.3.2023)

This, a bit of sexist role distribution in *Third Bullet's* drama, where female characters are just there to “give a sense of the diversity of the characters”, is actually well founded in art production of the period, where the political drama will most probably be something that men should be dealing with, whereas female

characters were mostly included in love-related topics. I was interested in this “victim-politician” character, so I focused my queries on him. The answer was expected and in accordance with previous, although very general, statements:

The “Politician's aria” in the chamber opera *Third Bullet* by composer Vojislav Vučković is a powerful and emotive piece that showcases the complex inner turmoil of a politician as they grapple with the weight of their decisions and the impact they have on their country and its citizens.

The aria begins with a slow and contemplative melody, reflecting the politician's introspection as they reflect on the choices they have made and the consequences that have followed. The melody gradually builds in intensity, reflecting the growing sense of guilt and responsibility that the politician feels as they realize the impact of their actions.

The lyrics of the aria are equally powerful, with the politician expressing their regret and remorse for the harm they have caused, while also acknowledging their own human frailty and the pressures and temptations that led to their actions. The words convey a sense of deep self-reflection and a genuine desire to make amends for the harm they have caused.

Musically, the aria is characterized by its use of dissonant harmonies and angular melodies, which reflect the internal conflicts and turmoil that the politician is experiencing. The orchestration is sparse and minimalist, with a focus on the voice of the politician, which further emphasizes the personal and introspective nature of the piece (ChatGPT, chat message to the author, 4.3.2023).

After this, it started repeating its answers. They were logical but with no further information regarding the details of the opera. It just restated what it already wrote with the same confidence, like this piece of music really exists. It even generated fake references to important recordings and books about this opera, so I decided to see if it could do more.

### **Outside the text**

I was determined to keep provoking the chatbot to generate even more details about this opera but encountered several problems. It even apologized for not being able to find the score online, but never implied that there would be a reason to question the correctness of the provided data. That may be a reason why, although it is capable of making templates of different kinds of analysis and descriptions of the music, it couldn't produce actual music on the same level as text. It cannot produce midi files or parts of the score, but I tried to provoke it to give me a code that could produce midi or musicXML. Although it mostly makes correct code that compiles and produces wanted files, the musical result

is nonsensical for both Python and Csound, regardless of the elaboration of the given description. It offered me, though, to try other OpenAI services, such as DALL-E and Jukebox, in order to get the audio-visual data for my queries. I did so, and even though the results are interesting, they are still far from the quality of answers given in the textual form.

Valuable results were obtained from DALL-E, a text-to-image generator that makes visuals according to given descriptions. It made it possible to see photos and costumes from the premiere of the opera *Third Bullet*, a poster and a score (examples are at the end of the text). As one can notice, photos are the most convincing of all the visuals, with scenery and costumes that are expected in operatic work such as this. The posters made it obvious that DALL-E can generate text-like visuals, but not actual readable text. The same is valid for scores. Although one can stretch their imagination and view them as graphical scores, the prevailing impression is that those are just score-like images.

Experimenting with Jukebox, an OpenAI tool for audio generation according to the given sample proved to be a long shot for now. First, it needs a specific hardware GPU to run which I do not possess, and even though this is kind of hackable with help of a virtual machine on Google Colab, it needs a lot of computing resources and time to produce a very short sample. Furthermore, these samples are of equal quality as text generated by ChatGPT, imitating the well-known popular music genres (such as making songs in the style of The Beatles or Nirvana), but as far as I can see, it still doesn't work with 20<sup>th</sup>-century classical music. It relies on a list of genres and very formalized musical models that seem to offer the possibility to be expanded, but I couldn't produce any meaningful results before the deadline for this paper. Regardless of my current impressions, as I mentioned earlier, these are all just experiments and "works in progress", so having the possibility to hear how "Politician's aria" might sound is just a matter of time.

## Conclusion

At the beginning of the text, I promised that this anecdotal method of presenting experiences from my experiment was chosen intentionally in order to prove the point. I was inspired to do so by books from the edition "New Material History of Music", especially one titled *The Haydn Economy*, where author Nicholas Mathews explains the "New historicism's" emphasis of the anecdote: "the value of the anecdote is that it disrupts the formal historical narrative and lets history happen with a lack of closure" (Mathews 2022, 56). I naively connected this with my chat with ChatGPT. On one side, these chats of mine constitute historical trivia, something like a modern-day scrapbook, informal notions on a

certain topic, so they can potentially “point the scholar down new side streets of microhistorical description, toward elaborate reanimation of past relationships” (Mathews 2022, 55), in this case between human and machine. On the other hand, even though the machine’s answers in this paper are very conclusive, it lets this alternative history “happen with lack of closure”, by endlessly generating new similar versions of “what it might look like”, although each of these particular histories are (for now) presented in a concluded and definite “closed” way. So, my idea was to create an anecdotal microhistorical description on the basis of available data (chats) and events that really occurred (my experiment with ChatGPT) in order to avoid my text looking similar to what ChatGPT would assume it might be.<sup>3</sup>

Although it would be possible and far less demanding to write this very paper with the help of ChatGPT, I didn’t use it for writing because it very well emulates my regular academic discourse, and really makes my writing better in terms of style and grammar, but also makes it look more generic and faceless (the same effect is achieved with many human academic reviewers already). I used the chatbot to generate what appears to be musicological data and presented my encounter with it from the standpoint of a researcher who discovered new historical artefacts and attempted to understand their meaning. These artefacts are different from the ones in our real past because they are intentionally generated, but they are no less part of our cultural heritage. So, it looks like this experiment proved that generated works could/should be approached similarly to human-composed ones, and it seems that applying the current analytical methods to these AI-generated historical templates might result in meaningful conclusions since they are both dependent on a similar knowledge base. Nevertheless, it appears that the chatbot can also do the analysis of the work it generates, so it can re-produce the knowledge in itself by furthering and elaborating upon what for humans appears as an error. But there were numerous examples of monumental historical narratives built around errors, that once didn’t seem wrong, so we can assume that this fact is also included in the machine-made predictions. So, should we let these histories “happen” and just accept them as equal to real ones or shall we deny them as fake? Either way, it seems we’ll have to deal with them, since they account for a big part of our current reality and, as such, determine our outlook on the past. We might have to learn how to share our knowledge of the past with machines.

One of the fundamental musicological assumptions is that music does not affect society until a human writes something about it, revealing its importance, criticizing it, comparing and analyzing it, and ultimately influencing future be-

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3 ChatGPT has limited knowledge of events that occurred after September 2021, so it will unlikely be familiar with this edition.



havior. Today, we humans are not alone in doing this, machines have also started doing it, and they are getting better at it. How humans should approach this expanded reality is the question currently being dealt with “on the highest levels”, but in the meantime, we are presented with the challenge of finding our way through increasingly machine-dominated humanities. Maybe we should ask ChatGPT for advice.



**Figure 1.** Black and white photo from the premiere of opera *Third Bullet* by Vojislav Vučković, generated with DALL-E, 4.3.2023.



**Figure 2.** Color photo from the premiere of opera *Third Bullet* by Vojislav Vučković, generated with DALL-E, 4.3.2023.



**Figure 3.** Costumes for opera *Third Bullet* by Vojislav Vučković, generated with DALL-E, 4.3.2023.



**Figure 4.** Segment from the score for opera *Third Bullet* by Vojislav Vučković generated with DALL-E, 4.3.2023.



**Figure 5.** Poster for the premiere of opera *Third Bullet* by Vojislav Vučković, generated with DALL-E, 4.3.2023.

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**OPERA THIRD BULLET BY VOJISLAV VUČKOVIĆ, OR  
HOW WOULD CHATGPT DO ON THE MUSICOLOGY EXAM?  
(summary)**

This paper is based on an anecdote about the experience of the author in using ChatGPT to answer questions related to the history of music. Since the chatbot started to give wrong but believable answers, the chat evolved into a lengthy experiment that resulted with an analysis of the opera *Third Bullet*, composed by Vojislav Vučković. The opera and its composer, and all other data related to them, were generated by ChatGPT. Although the composer Vojislav Vučković is a person who actually existed, the one in focus here is fictional, or perhaps better yet, a synthesized figure, made as a prediction on how such a figure might be. The aim of the paper is to try to determine if this artificial historic figure is a relevant topic for musicological analysis, and what can we conclude from dealing with works that don't exist. The paper also discusses a question of their existence, since they are there, in front of us, materializing on a click according to the perception of human history by a machine. So the main goal of the experiment is to question the possibilities for implementation of this kind of text-based AI in musicological work, and to raise awareness of this kind of synthetic history of music that is available to us.

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Scholarly debate

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# COMPUTING SHORT FILMS USING LANGUAGE-GUIDED DIFFUSION AND VOCODING THROUGH VIRTUAL TIMELINES OF SUMMARIES<sup>1</sup>

**Abstract:** Language-guided generative models are increasingly used in audiovisual production. Image diffusion allows for the development of video sequences and some of its coordination can be established by *text prompts*. This research automates a video production pipeline leveraging CLIP-guidance with longform text inputs and a separate text-to-speech system. We introduce a method for producing frame-accurate video and audio summaries using a virtual timeline and document a set of video outputs with diverging parameters. Our approach was applied in

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the production of the film *Irreplaceable Biography* and contributes to a future where multimodal generative architectures are set as underlying mechanisms to establish visual sequences in time. We contribute to a practice where language modelling is part of a shared and learned representation which can support professional video production, specifically used as a vehicle throughout the composition process as potential videography in physical space.

**Keywords:** artificial filmmaking, deep generative models, language-guided diffusion, short film computing, audiovisual composition, multimodal sequencing.

## Introduction

Deep generative models have been used in film and audiovisual production by producing data according to a learned representation (Akten, Fiebrink, and Grierson 2020). Variational autoencoders and adversarial networks proved to be very efficient in generating both video and sound sequences, and more recently diffusion has become of great relevance to the state of the art (Dhariwal and Nichol 2021). Outputs are generated from deep generative models at least in two types of procedures: 1) to sample a compressed learned representation based on feature values captured by its learning procedure, e.g., a latent space vector; and 2) to reconstruct specific missing pieces of data according to their compressed learned representation, which is a discrete procedure and works as a filter that practitioners can control (Brooks, Holynski, and Efros 2022). Natural language has become a guiding principle in each one of these procedures, namely in image diffusion, where *text prompts* can sample a model and guide arbitrary data reconstruction, e.g., *inpainting* and *outpainting* (Chang et al. 2023). With implementations that work out moving images, the diffusion process can be established as continuous and sequences of prompts act at specific frames (Liu and Chilton 2022b).

We propose to consider text as the main representation mechanism of a set of generative models by building on image diffusion implementations with classifier guidance (Offert 2022). Ways of defining event sequences as sets of text prompts are tied to specific frames and this happens as models like CLIP evaluate every diffusion iteration and both text and image embeddings are scheduled first-hand (Kim, Kwon, and Ye 2022). We propose an implementation which wraps a virtual timeline organised with instructions for the entirety of each produced render. We design three possible sequencers in which the programmatic procedure of frame-by-frame production is automated by plugging an image diffusion system with a transformer summariser and a text-to-speech (TTS) vo-

coder where arbitrary texts can guide output sequences. In this way, a virtual timeline can control both the image and sound systems with a shared text representation, presenting a modular approach practitioners can build upon considering a model's experimental ability to create around specific initial inputs. A film using these technologies is documented and a working implementation is provided to compute sets of frames and audio buffers from text files using established deep learning libraries. By coordinating the used models together, we provide research on language-guided sequencing and establish a discussion on possible futures of filmmaking and audiovisual production using purely deep generative models which coordinate field of view representations with speech-based soundtracks.

## 1. Language-guided diffusion

Diffusion appears as a successor of other generative model architectures demonstrating remarkable results in vision (Croitoru et al. 2022). Inspired by non-equilibrium thermodynamics models, implementations work through a *forward* and *reverse* process, perturbing data using, e.g. Gaussian noise, and gradually learning to reverse it back (Sohl-Dickstein et al. 2015). By doing this procedure in steps, the approximation mechanism can be guided by natural language, each frame generating network encodings (Nichol et al. 2021). Diffusion models with classifier guidance allow us to generate images from *text prompts*, where a trained diffusion model score estimate is computed with a gradient of an independent image classifier (Dhariwal and Nichol 2021), as opposed to other latent sampling methodologies, see Rombach et al. (2022). When achieved using a network like CLIP (*Contrastive Language-Image Pre-training*), each diffusion step is guided towards a supposed natural language description, chunking each image to the model's compressed representation, often in 224 x 224 px (Radford et al. 2021). Without any conditional input mask, when developing a moving image entirely from a textual description, current implementations allow diffusion of a first frame from noise and further play with diffusion step percentages and variable prompts at future frames (Nichol and Dhariwal 2021).

### 1.1 Moving image model architecture

One possible way to successfully generate sequences of frames with classifier guidance with no image input relies on diffusing a first frame from a prompt and conditioning the next ones with arbitrary transformations and step skipping.<sup>2</sup> Flow coherency can then be worked out, allowing new images to visually

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2 There are very different ways to point the first diffusion iteration towards some visual

match the previous while incrementing new model seeds. Simple image diffusion architectures can automate the process of creating *image-text* embeddings from arrays of prompt strings and guide the denoising progressive sampling (Song, Meng, and Ermon 2020). From the automation of this process, compensation can be added from the second frame onwards, passing the resulting image data as a texture to separate models such as, e.g. MiDaS (Ranftl et al. 2022) and AdaBins (Bhat, Alhashim, and Wonka 2021), estimating depth maps and computing projections on controllable fields of view using renderer cameras. Using this procedure each returned mask is used with specific weight in the next diffused frame, allowing to practice moving image flows; ways of introducing text prompts at specific frames have already been successful in coordinating CLIP embeddings with the process of progressive sampling (DDIM) (Salimans and Ho 2022). Recently introduced implementations with depth transformation have emerged with the notion of artificial camera objects creating a field of view in the processing workflow, resulting in rough spatial blueprints (Ravi et al. 2020);<sup>3</sup> as well as produced movement by estimating concrete separations between objects from each frame’s emerging shapes.<sup>4</sup> With long diffusion renders with no variable prompt and low percentages of step skipping, saturation is experienced for the lack of variability in the picture. Current frames here are understood as enforcing future ones towards new variations and bridges with *video-to-video* rationale (Kim, Kwon, and Ye 2022).

## 2. Extending diffusion architectures with timelines

Implementations like DALL-E 2 and Imagen have had great impact in exposing how generative models can create realistic images from a description of natural language (Ramesh et al. 2022; Saharia et al. 2022), yet open implementations offer great modularity in integration e.g., Katherine Crowson’s guided diffusion, disco diffusion<sup>5</sup> and stable diffusion; of classifier guidance (Dhariwal and Nichol 2021). Each video sequence starts by initially establishing sets of

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structure with a single image condition, in the provided implementation we create a 705x384 black pixel array as an option, perceptible in section 3 using high step skipping.

3 Acute motion changes between diffused frames are perceptible by pixel clamping created at the direction of the camera transform. In our implementation we zoom and rotate both x and y axes using a fixed angle across the sequence.

4 The potential for future work in this area should be acknowledged, allowing for the introduction of other image recognition and segmentation systems to operate at the diffusion pass without the need to retrain a new system.

5 Our implementation targets almost every released version of the *disco-diffusion* open-source project, where we integrate the virtual timeline and speech system to be used on consumer-grade GPUs.

text prompts at specific frames and render towards a max number to then encode at variable frame rates; e.g., a simple automation of CLIP guidance is to incrementally establish sets of key frames with noise prompt values randomising embeddings. In our research we target the automation of this step, encoding into the CLIP model processed pieces of arbitrary text and derive them as values to a central timeline scheduler, with data structure and three proposed sequencing algorithms described in the high level processing diagram (Figure 1). Using an LED (*Longformer Encoder-Decoder*) transformer trained on longform texts with a separate GPT-J-6B,<sup>6</sup> we compute sets of summaries and schedule them using a simple matrix with a backbone of *frame:prompt* (Beltagy, Peters, and Cohan 2020), invoking both target embeddings and specific narration events in a separate audio track, with speech derived from both transformers. Working with sections is also possible, as the length of both modalities is of relevance when matching and with our working implementation variability can be further explored as well as, e.g., quantisation by incrementing values on the step skipping across diffused frames, as a way in which different shots and model-specific variables can be organised with their own language sections in higher sequence length.<sup>7</sup> To provide grounds for appropriation we set up three simple sequencers to define working timelines based on: 1) an arbitrary input text file; and 2) the computed speech length or user-defined length. The max number is a variable derived from the entire summary set over the image diffusion process regardless of derived prompts, computing at 25 frames-per-second (FPS) and dependent on sequencer choice, with 44.1kHz using spectral masking on each decoded audio batch.

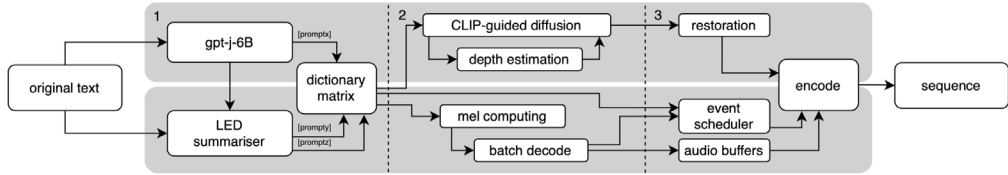
## 2.1 Sequencing audio buffers and video frames

Transforming the input text through a timeline to serve as a session template of the generative model architecture is here proposed as a methodology to sequence the already working integrations of language-guided diffusion, depth computing and TTS. We propose a programmatic procedure whereby feeding text to a timeline sequencer we set up a matrix storage, *frame:prompt* dictionaries, generated text and other needed variables regarding audio buffers and diffused frames. In Figure 1, the processing workflow is divided from the original text string input to the sequence output, where from left to right: 1) virtual timeline definition and text processing through an LED summariser trained on

6 Third person reference and paragraph-sized coherence in the produced speech is characteristic of summarisation, yet we implement a transformer generator from EleutherAI to add variability between image and TTS prompts.

7 Previous work has been proposed on trying to model sequences such as film dialogue using neural networks, see Sunspring (2016) by Oscar Sharp.

*BookSum* dataset (Kryscinski et al. 2021) and a GPT-J-6B instantiation (Muenighoff 2022), where the LED computes both the raw summary and a GPT-generated one using the raw as input; 2) image diffusion with depth transformation and TTS; and 3) the encoding process, where timeline variables can be further used for editing. The timeline object has a matrix where the sequencers establish the entire prompt sequence and their specific frames, depicted in Algorithm 1, can be understood as: 1) based on sequence length from user input, space prompt summary outputs with equal distances at defined FPS and compute their TTS separately to the same folder; 2) without sequence length definition calculate sequence length from TTS in seconds and compensate one each side; and 3) without sequence length definition do step 2) but compute TTS separately and establish five second prompts for each summarised sentence. Matching speech length and diffused frames opens up future research possibilities regarding variable skip steps and how to organise transitions, which can be word accurate.<sup>8</sup> With these simple sequencers the timeline object can interface with CLIP



**Algorithm 1:** Populate timeline

**Input:** Raw text file  $\mathcal{T}$ , length  $\mathcal{L}$

**Output:** Matrix  $\mathcal{M}$  with params and keyframes

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1 for  $t \in \mathcal{T}$  do
2    $\mathcal{M} \leftarrow \begin{bmatrix} [LED(t)] & [GPTJ(t)] \\ [i_0 - i_n] & [p_0 - p_n] \end{bmatrix}$ 
3   for  $i \leftarrow 0$  to  $|\mathcal{M}_{1,1}|$  do
4      $seq_1 \leftarrow [0, \frac{\mathcal{L}}{|\mathcal{M}_{1,1}|}, 2 \cdot \frac{\mathcal{L}}{|\mathcal{M}_{1,1}|}, \dots, (|\mathcal{M}_{1,1}| - 1) \cdot \frac{\mathcal{L}}{|\mathcal{M}_{1,1}|}]$ ;
5     let  $\mathcal{L} \leftarrow \sum t_i$ , where  $t_i = TTS(\mathcal{M}_{1,1}[i])$  for  $i = 0, 1, \dots, |\mathcal{M}_{1,1}| - 1$ 
6      $seq_2 \leftarrow [0, \frac{\mathcal{L}}{\sum t_i}, 2 \cdot \frac{\mathcal{L}}{\sum t_i}, \dots, (\sum t_i - 1) \cdot \frac{\mathcal{L}}{\sum t_i}]$ ;
7      $\mathcal{M}_{2,2} \leftarrow \mathcal{M}_{1,1}$ ;
8     let  $\mathcal{L} \leftarrow \sum t_i + 5 \cdot (|\mathcal{M}_{1,1}| - 1)$ , where  $t_i = TTS(\mathcal{M}_{1,1}[i])$  for
        $i = 0, 1, \dots, |\mathcal{M}_{1,1}| - 1$ 
9      $seq_3 \leftarrow [0, \frac{\mathcal{L}}{\sum t_i + 5 \cdot (|\mathcal{M}_{1,1}| - 1)}, 2 \cdot \frac{\mathcal{L}}{\sum t_i + 5 \cdot (|\mathcal{M}_{1,1}| - 1)}, \dots, (\sum t_i + 5 \cdot$ 
        $(|\mathcal{M}_{1,1}| - 1) - 1) \cdot \frac{\mathcal{L}}{\sum t_i + 5 \cdot (|\mathcal{M}_{1,1}| - 1)}]$ ;
10     $\mathcal{M}_{2,1} \in \{seq_1, seq_2, seq_3\}$ ;
11  end
12 end
13 return  $\mathcal{M}, \mathcal{L}$ ;
```

**Figure 1.** High-level diagram of the proposed architecture extension, where *timeline matrix* represents needed sets of values which guide both the image diffusion setup and vocoder TTS. In the algorithmic table we propose a matrix with processed outputs from the input text and sets of arrays with frame-prompt pairs, with the sequence length defined or not by the user.

<sup>8</sup> Systems design specifically on grammar understanding with language models, see e.g., Chung et al. 2022.

embeddings (Kim, Kwon, and Ye 2022). Inference through tacotron2 is done separately from single summary elements and decoding the mel results using hifi-gan we establish timings at the beginning of each render, focusing part 2) of the processing workflow solely on diffusion and audio buffer generation (Shen et al. 2018; Kong, Kim, and Bae 2020).

### 3. Irreplaceable Biography (2022)

Film and audiovisual production has benefitted from these different types of generative models both in coordination and in isolation, for offline and real-time scenarios (Navas 2017). Shifting towards a realm where language dictates their sampling and approximation procedure, each model in a set works together to form objects in fields of view exposing a learnt representation, with added fuzziness through implementation policies when computing a loss or score. For moving images, it is not just the textual guidance of the image frame that matters, but also how guidance keeps happening, and what to enforce when undesirable elements are represented in the same space that practitioners want to describe. Swapping models of the same target function in architectures such as the one proposed here is itself an act of conditioning, in what is supposedly a future of filmmaking and audiovisual production engineered around the human head. With that change, e.g., different voices can be used in the same time settings with the same text, representing cultural and physical nuances in the same way an image dataset does as the only visual record limiting a supposed memory system.<sup>9</sup> As a practical composition using the described methodologies, the film *Irreplaceable Biography* was produced around the premise of limit and established borders of representation a deep learning model can have. That if building sequencers in the current clock-based computers used to process image data, the possible outputs of complex vision systems are limited in the same way a human is, regarding the ability to translate or universalise beyond perspectivist context, harnessing a specific future which pursues the development of AI systems *as if* it was seen, imagined or thought, where learned representations keyframe specific cultural and human time. The architecture was designed to coordinate a 4-minute 20-second sequence of the poem *A Song of Myself* (1892 version) exposing what it could generate from summarisation procedures.<sup>10</sup>

9 Earlier research has demonstrated how generative vision models can bias a previously encoded image from their inner specific representation targeting *style-transfer* techniques (Akten, Fiebrink, and Grierson 2019).

10 Practical differences from the provided implementation rely on; 1) a secondary ImageNet model to yield better results, class-conditioning the diffusion backward steps for additional guidance; see Nichol et al. (2021); 2) forward tracking shot that doesn't saturate, stuck at 50% of



Figure 2. *Irreplaceable Biography*, 24 exported frames with semi-equal distance.

## Results and future work

Text prompt sets have proven to be successful in combining single prompt weights through engineering specifications (Liu and Chilton 2022a). Diffusion renders can be automated and scheduled using templates which specify high-level parameters, namely frame-accurate sets of descriptions. Building on the already successful implementations of CLIP-guided diffusion with depth computing, we propose to automate the generative process with timelines where summaries prompt the full length of each sequence and provide a matrix representation to be used in different attempts. These summaries are dependent on user input, namely a text file, and determine visual elements of the video frame sequence and the TTS system at the same time; even if not literally matching. We provide an implementation using open machine learning standards where

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condition from previous frame.

new sequences can be produced even with multiple runs at the same time. Using these methods, we rely on the success of both step-based diffusion coherence across frames, namely the roughness of each transform according to the first, with the depth estimation success. We propose a timeline template as a way to share and organise variables which condition the overall generative process. Natural language has been a fundamental way to declare all sorts of events in film and audiovisual practices, be it through poems, scripts, or just, in this case, patterns of written instructions which dictate future behaviour descriptively on a multimodal shared architecture of instanced network graphs. We promote that future work should derive new methods of coordination between trained models which together create small parts of human visual experience, considering the full video sequence to propagate culture by the fact models once learned from a small set of records created around the physical world. We claim that with our procedures text prompt sets can be used as blueprints to a time-based control mechanism, specifically with transformer and diffusion models (Esser, Rombach, and Ommer 2021), and help reveal the intrinsic fragments of datasets marked in each model's learned representation.

#### 4.1 Working implementation

Targeting platforms which democratise torch model instantiation we provide a small Python library with a virtual timeline object to structure the depicted model architecture using OpenCLIP with a single ViT-B-32 with batches of 4 cuts,<sup>11</sup> and a separate grammar corrector FLAN-t5 (Subramanian 2018; Schuhmann et al. 2022; Chung et al. 2022). We built for NVIDIA graphics cards, tested with PNY 3090 24Gb XR8 and Quadro P6000. The timeline is organised around: 1) the full length of each sequence, manually added by the user or computed from the generated TTS length; 2) the sequencers which output usable instructions for CLIP-guidance; 3) text processors to derive new text and populate storage; and 4) other render-related variables such as namespaces, formal ratios, frame buffers. Our implementation is modular and as objective future work we propose: 1) audio diffusion TTS with classifier guidance has already been proposed and could be further implemented (Kim, Kim, and Yoon 2022); 2) a more manageable way to deal with frame-shot composition, by indexing specific parts of each step with direct object placement alongside camera transforms;<sup>12</sup> 3) speech-related sound manipulation and voice translation directly in the used library; 4) tokens (words) and concepts to remove from each prompt set and neg-

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11 In every iteration each cut of the image is compared against the prompt, offering a choice to accumulate gradients in batches.

12 Recent research has been successful in still images using latent models, see Ma et al. (2023)



ative weight management; and 5) manageable camera movement descriptions with visual declaration. We provide command line installation with a dedicated environment tested on Ubuntu 22.04 with instructions<sup>13</sup> and a set of videos with different lengths using a set of texts from online poetry platforms. If under 250 characters the whole text is given to the summariser module, otherwise just the beginning is. The videos experiment with different camera trucks and keyframes to help follow the embeddings and how imagery develops, in purely black and white contexts with slow movement velocities.<sup>14</sup> Variability on a frame-by-frame condition regarding camera and cinematic languages should be exercised and current AI architectures should encompass higher-level declarations over spe-

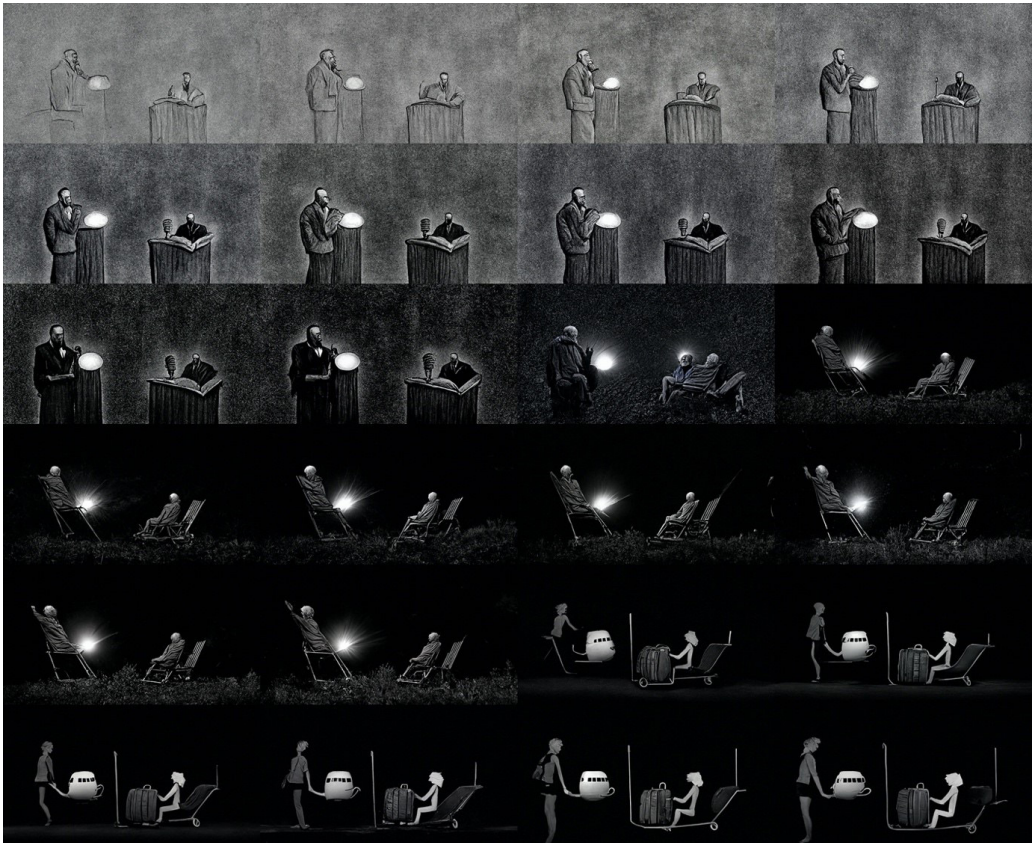


**Figure 3.** (30 seconds, 5 prompts) 4x6 frame export from the computed sequence using *Acquainted with the Night* by Robert Frost (1928), exercising diagonal translation. The generated prompts and timecodes are: 1) 00:00:00, “The narrator struggles to find clarity in the relationship between her and the other characters.”; 2) 00:00:06, “Great scientists discover a natural disaster.”; 3) 00:00:12, “Wife fear loss of job children.”; 3) 00:00:18, “Eventually a stranger brought relief to discover time actually helps to bring back wife.”; 4) 00:00:24, “The narrator continues to listen to the distortion of traffic lights and becomes annoyed when people fall asleep on the roads”.

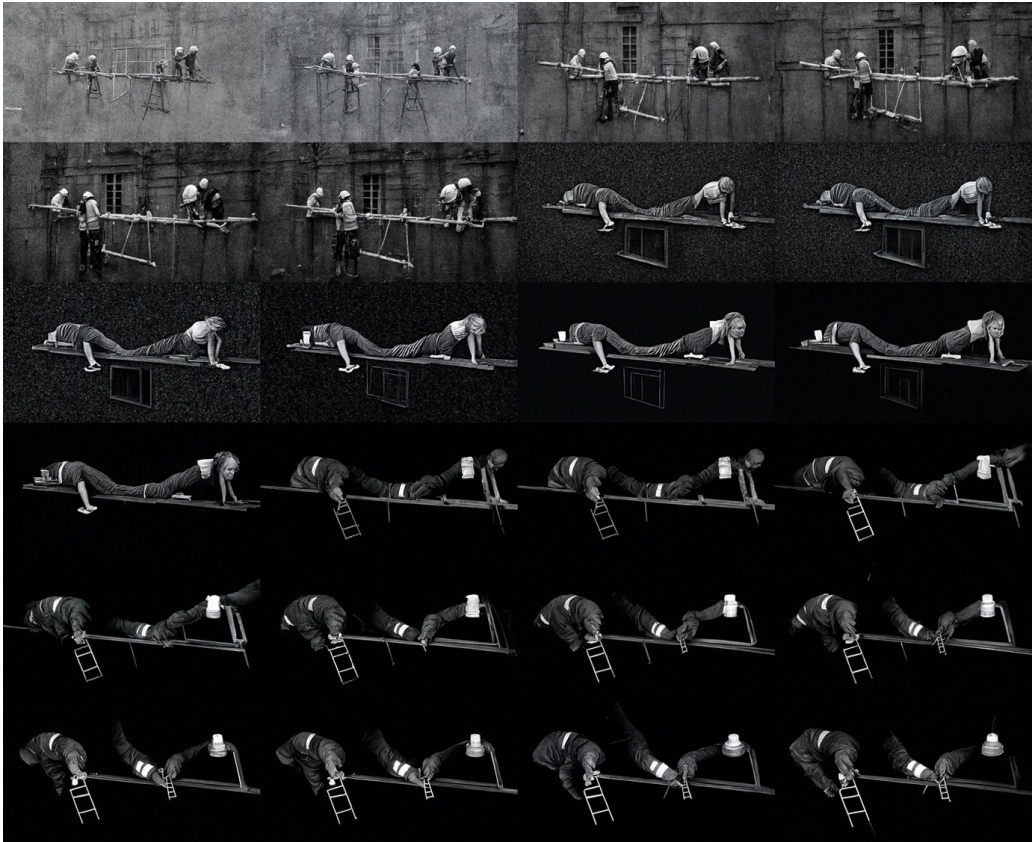
13 <https://github.com/luisArandas/virtual-timeline-clipguided> (accessed 10-07-2023).

14 The provided examples are not entirely greyscale and had no color correction whatsoever.

cific trajectories following realism standards. At each new prompt keyframe, the embedding computation can be injected with needed distributions.



**Figure 4.** (30 seconds, 3 prompts) 4x6 frame export from the computed sequence using *Do not go gentle into that good night* by Dylan Thomas (1947), exercising slow movement. The generated prompts and timecodes are: 1) 00:00:00, “The narrator delivers a long speech in which he implores us to rage against the dying of the light and against mankind’s tendency to go greedily into that good night.”; 2) 00:00:10, “He lists all sorts of examples of people who have succumbed to the darkness and urged us to do the same: Old men who have spent their lives helping to keep the sun out of the sky”; 3) 00:00:20, “But who lost it because they were too late to help it travel its way”.



**Figure 5.** (30 seconds, 3 prompts) 4x6 frame export from the computed sequence using *Scaffolding* by Seamus Heaney (1966), exercising slow movement. The generated prompts and timecodes are: 1) 00:00:00, “The wall builders that we have here at Boulogne house are careful to test the scaffolding before they start building.”; 2) 00:00:10, “Make sure planks won’t slip at busy times.”; 3) 00:00:20, “Secure all ladders and tighten bolted joints”.



**Figure 6.** (20 seconds, 2 prompts) 4x6 frame export from the computed sequence using *Yours* by Daniel Hoffman, exercising visual dialogue design. The generated prompts and timecodes are: 1) 00:00:00, “In this short poem.”; 2) 00:00:10, “Roxane reminds Christian that he is her true love and that without her he would be nothing”.



**Figure 7.** (20 seconds, 2 prompts) 4x6 frame export from the computed sequence using *Still I Rise* by Maya Angelou (1978), exercising visual dialogue design. The generated prompts and timecodes are: 1) 00:00:00, “Still I will rise”; 2) 00:00:10, “Like a black ocean rising”.



**Figure 8.** (25 seconds, 1 prompt) 4x6 frame export from the computed sequence using a piece of text extracted from a public website *The Royal Parks* about trees in Regent's Park and Primrose Hill. Selected paragraph: "Trees host complex microhabitats. When young, they offer habitation and food to amazing communities of birds, insects, lichen and fungi. When ancient, their trunks also provide the hollow cover needed by species such as bats, woodboring beetles, tawny owls and woodpeckers. One mature oak can be home to as many as 500 different species. Richmond Park is full of such trees, which is one of the reasons it has been designated a National Nature Reserve and Site of Special Scientific Interest". Selected prompt, used throughout the whole sequence: 00:00:00, "Narrator explains tree like oak import ecologist provide wide range biological service like Redmond park include wood butt wood owl wood pick beetle". This output has the transform on the y axis instead of x allowing positive rotation, exploring movement stability without enforcing new language without visual feedback.

## Conclusion

Language has become a very successful method to coordinate image diffusion systems. From progressive sampling to still image editing mechanisms, diffusion models provide clear ways in which we can set up frame sequences. By extending language-guided video production we focused on how text prompts create templates of a programmatic procedure by defining event sequences and audio narration, proposing a virtual timeline implementation which allows us to compute arbitrary texts using established machine learning frameworks. By implementing a set of sequencers we designed a usable model architecture as an extension of image diffusion with classifier guidance where sets of prompts define both aesthetic and formal properties of the image and speech through generated summaries with frame accuracy. We experimented with the architecture's ability to represent a certain input text and how this coordination defines fields of view; which themselves are products of a model's approximation ability in representing the dataset it learned from. Our implementation follows open standards and allows us to produce new sequences using arbitrary text files with variable tracking shots. Further, we documented the short film *Irreplaceable Biography* as a material application of these methodologies and promoted a discussion on how learnt representations consequentially reveal aspects of physical reality by providing a rough simulation of what established film and audiovisual practices search for, outlining both documental and abstractive character. Systematic production of audiovisual sequences regarding text descriptions can benefit from simple implementations as diagrams of automatic procedures.

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## COMPUTING SHORT FILMS USING LANGUAGE-GUIDED DIFFUSION AND VOCODING THROUGH VIRTUAL TIMELINES OF SUMMARIES

### (summary)

Language-guided generative models are being proposed to deal with numerous tasks across audiovisual production. Of great relevance has been the application of image diffusion to generate frames from *text prompts* and develop video sequences, formally describing content and other visual properties already found in still image composition. Current implementations with classifier guidance take advantage of models which represent images and text descriptions in a shared space; with this research, we automate a video production pipeline using CLIP-guided diffusion, allowing the introduction of arbitrary longform text inputs, pairing with a text-to-speech (TTS) system. Using a virtual timeline implementation we produce sets of frame-accurate summaries providing a method which allows us to produce sets of video frames and audio buffers for reproduction. Compliant with system design, we document the production of the film *Irreplaceable Biography* where our proposal targets deep generative model architectures’ ability in coordinating visual elements through CLIP-guidance, among other moving image transformations like depth estimation. We introduce sets of summaries as text prompts to display a structure and automatically define sections of both video sequences and soundtracks using the same input. With this research we extend on the role of language to guide film and audiovisual production with its declarative and descriptive role, organising events and other formal properties of both the picture and sound targeting purely artificial outputs. We contribute to a future of filmmaking and virtual production where multimodal generative architectures are used as sequencers, following a simulation of the human head, perspective and experience. It is within current ventures of language modelling that we argue it can contribute to a shared representation which dictates how a video should *look like* and help leverage a simulation of what could be videography in the physical space.

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## **THIS IS MY INSTRUMENT: AN APPROACH TOWARDS PERFORMANCE PRACTICE FOR INTEGRATED CONCERTS**

**Abstract:** The Belgium-based Nadar Ensemble is a new music ensemble that specializes in performing curated and integrated concerts. In this case ‘integrated’ infers that all aspects of the concert are taken into consideration. Questioning, developing, and instrumentalizing video, light and sound design (including live electronics), costuming, decor, and even personnel such as a conductor and other roles typically inherent to an ensembles’ tradition, have become an integral part of Nadar’s and other similar ensembles’ concert programming. In this paper I will specifically lay out the manners in which the musicians of Nadar Ensemble approach what they have grown to see as their broadened instruments, including the use of live electronics, game controllers and newly made instruments. I will also discuss ideas surrounding the so-called ‘attacca concert’ and post-instrumental practice by delving into two cases, the event *Dead Serious* (2014) and the concert program *Extensions* (2015).

**Keywords:** integrated concerts, post-instrumental practice, transdisciplinary performance practices, curated concerts.

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## Introduction

During an interview, Pieter Matthyssens, artistic co-director of the Belgium-based new music ensemble Nadar Ensemble, said that he and Stefan Prins (his partner co-director) aim with Nadar to create ‘curated concerts’, programs in which “video, scenography, the lights become a total concept” (Matthyssens 2020). I will argue in this article that in order to reach this artistic goal, they not only actively question, develop, instrumentalize and integrate video, scenography and light, but many other aspects of the performance, and that this has also become an inherent definition of Nadar. The ensemble is of course not just made up of its artistic directors, but includes ten fixed members<sup>2</sup> who, as part of this ‘curated concert’ artistic practice have, in a relatively short time period needed to expand their own artistic and instrumental practices to include performing on a broadened array of conventional and newly made instruments as well as live electronics. They have also taken on non-conventional roles such as operating drones, smoke machines, and show-calling. I will attempt to frame these performers’ strategies and performance practices that have been developed for this relatively new evolution. To do so, I will examine two of Nadar’s more prominent curated concerts: the event *Dead Serious* that was made for the Darmstadt Summer Course in 2014 and the concert program *ExTensions*, premiered at the Gaudeamus Muziekweek 2015.

As a way of introducing Nadar Ensemble, I noted that they<sup>3</sup> utilize aspects of the performing arts that are not necessarily considered when putting on a concert that, although contemporary, is still rooted in the contemporary Western art music tradition. I like to call this approach ‘integrated concerts’ and use this term to sharpen and delineate the subgenre that I have studied (Moore 2023) and, thus, will refer to throughout this article. By integrated concerts I mean concerts in which, among other aspects of a performance, video, light and sound design (e.g., live electronics), decor, and utilization of a conductor (and other roles typically inherent to an ensembles’ tradition) are all integral parts of the concert curation and/or programming. This definition is derived from the research of Tanja Orning (Orning 2019), Martijn Mulder, (Mulder and Hitters 2021) and Iga Batog (Batog 2020) and from personal conversations with Pieter Matthyssens (artistic co-director Nadar Ensemble) (Matthyssens 2020), Bas Wiegers (principal guest conductor Klangforum Wien) (Wiegers 2019), Koen Kessels (music director Royal Ballet, London), and Nico Couck (professor of

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2 Myself included.

3 Though a member of Nadar Ensemble, I will attempt to remain objective and thus refer to the group as ‘they’.

guitar, Royal Conservatoire of Antwerp) between 2017–2020. In regard to this paper, it is important to note that Nadar is not the only ensemble pursuing this path. Other groups include Ensemble Pamplemousse from the US, Sound Initiative in Paris, ICTUS in Brussels, and MusikFabrik in Cologne.

It may be clear to some readers that this definition is also very closely related to (and inspired by) what composer-performer Jennifer Walshe wrote in her well-known 2016 manifesto on *The New Disciplines* (“The New Discipline” n.d.). Musicologist Monika Voithofer stated in her detailed analysis of Walshe’s concepts that:

music here is no longer autonomous; it is interdependent with the other arts, and defiantly so. In particular, the digital transformation influences and offers new possibilities of interweaving these various media ... The New Discipline is an intermedia art practice, since it integrates various media such as dance, theatre, film, video, the visual arts, installations, literature and even stand-up comedy (Voithofer 2020).

While Nadar’s approach (integrated concerts) is very similar and there is obvious overlap between the two approaches,<sup>4</sup> I would argue that Nadar applies an approach that is distinct in two manners. First, Nadar (usually) presents concerts with pieces by different composers. This necessarily requires a piece-by-piece perspective. Not all the works that Nadar presents are as heavily influenced by Walshe’s manifesto. And second, Walshe’s concept seems to be all encompassing. She writes that in her works (and other works she sees as being ‘New Discipline’), “the ear, the eye and the brain are expected to be active and engaged. Works in which we understand that there are people on the stage, and that these people are/have bodies” (“The New Discipline” n.d.). From personal experience, Walshe typically enhances a performer in a more complete fashion. As I will show below, Nadar is more willing to pick and choose aspects of a performer and other (arts) disciplines and retool them, devising new instruments and perspectives for their programs.

I also introduced Nadar Ensemble by mentioning that the ten musicians in the group have had to learn new instruments and roles through the years that they have been members. Many of the players have learned oddly specific percussion instruments like IKEA baskets, dog clickers, and light switches as well as mastered balloon scratching, chair squeaking, and match sticks. Håkon Stene, in his research on post-instrumental practice, calls this kind of musician a “nomadic gatherer [whose practice] becomes an attitude directed towards re-thinking and invention” (“Artistic Research: ‘This Is Not a Drum’ – towards a Post-Instrumental Practice | Håkon Stene” n.d.). Researcher and percussionist Louise Devenish,

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4 Nadar has also performed several of Walshe’s works.

building on Stene's research, further defines post-instrumental practice within four parameters: instrumentality, plurality, transferral, and integration (Devenish 2021). For the purpose of this paper, and especially upon reflecting on the inner workings of ensembles like Nader, Devenish's definition of transferral is especially relevant: "Utilizing 'technique transferral' as a means of exploration and execution, and subsequent development of performance practices specific to individual works, rather than individual instruments". As was discussed in an earlier article for this journal (Gielen and Moore 2022), an essential part of productions like Michael Beil's *Hide to Show* involve Nader's musicians being asked to step back from their principal instruments and apply their expertly honed single instrument skills in new transferable ways. It takes musicians to perform *Hide to Show*, however only 1/6<sup>th</sup> of the piece is performed on instruments. The rest of the performed material consists of acting, dancing, lip-syncing, singing, or movements, all of which have been notated in great detail.

Devenish's definition of 'plurality' (in post-instrumental practice) is also relevant for this study. She writes that the "use of instrumental materials [fulfils] a plurality of sonic and non-sonic roles in performance". As noted above, Nader's musicians apply multi-instrumentalism to fluidly combine several 'non-sonic' roles, both as performers as well as essential artistic roles played out behind the scenes. For example, Marieke Berendsen is both the violinist as well as the scenographer. Nader's flutist Katrien Gaelens is our yoga coach. Pieter Matthynsens is the ensemble's cellist and artistic co-director. I worked for many years as both the technical coordinator as well as the trombonist and conductor. Our pianist doubles on percussion and our percussionist doubles on piano. And lastly, all the players in the group have become experts on game controllers and other electronic-based instruments.

Nadar as an ensemble is in the business of presenting concerts, so before continuing with the cases studies I would first like to briefly pause and reflect on a few observable and current trends in the curation of new music today. Defining curation is admittedly no simple task. However, music critic and researcher Holly Tessler offers a good starting point:

Modern curation work is narrative in nature: telling a compelling story not just through a static collection and presentation of artefacts to a single, monolithic audience but through dynamic and multiply iterated discourse with a range of audiences, communities, and stakeholders (Tessler 2020).

Renowned professor of curation Dorothee Richter goes further and proposes that curation specifically of new music<sup>5</sup> should be a "practice that is deeply

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5 In this article, I use 'new music' to mean music written since 1950 and in the western art music tradition.

involved in the politics of display, politics of site, politics of transfer and translation, and regimes of visibility” (Freydank and Rebhahn 2019, 11). If we understand politics as, according to Jacques Rancière, giving form to society or to our living together (Rancière and Corcoran 2016). then Richter appears to suggest that every thinkable manner in which “audiences, communities, and stakeholders” relate can, and more importantly, should be taken into account when programming a concert. According to Richter, new music curators should consider thus how relationships in our world are displayed, the interplay involved on site (e.g., the history of specific concert venues), the participation (or lack thereof) of an audience, the participant’s ability to understand, enjoy, and be entertained (or not), and even the audience’s and presenter’s perceived position in society and how those interplay in (a) concert. In other words, all aspects appear to be open and fair game to a curator’s artistic notions. Returning to Tessler, the discourse with and position of certain ‘stakeholders’ in new music, namely the performers, has grown to be very dynamic in nature, fluid even (Moore 2016). Professional players (as shown above) are asked to learn new instruments and take on new roles within organizations, fluidly changing from, as Stene points out, their specialized instrument to “embracing the variety and complexity” of the post-instrumental strategy (“Artistic Research: ‘This Is Not a Drum’ – towards a Post-Instrumental Practice | Håkon Stene” n.d.). I would thus dare to add the following to Tessler’s and Richter’s definitions: curating, in addition to presentation, is also actively choosing specific tools and roles, and the way they are used and instrumentalized.

Nadar Ensemble’s artistic co-directors, Pieter Matthyssens and Stefan Prins, describe their manner of programming as creating ‘curated concerts’, in which each piece is “representative of its author” (composer, writer, improviser, etc.) while maintaining “the whole presentation as one event” (Prins 2019). Furthermore, these curated concerts can also be understood as integrated concerts, meaning (again) that all aspects of a performance are considered (as is suggested by Richter). This may also include the active choice of how certain roles will be instrumentalized to meet specific artistic aspirations. For example, Prins and Matthyssens have on several occasions described the conductor as ‘a visual element’, stating: “if you program concerts in which you think the visual element is really important, then putting it simply, with a conductor, you have a dancer on stage” (Prins 2019) – a component, a role and a person, flush with tradition, and thus ripe for customization and instrumentalization. A work that exemplifies this practice and which Nadar performs regularly is Alexander Khubeev’s *Ghost of Dystopia* (2014, rev 2019). Here the composer required a bound conductor to tell the story of the rise and fall of a dictator. The instrumentalized role, who again is a person, becomes a tactical leader, stepping forward from the ‘assembly’ as a tool “to be wielded and discarded when no longer required”

(Moore forthcoming; Hardt and Negri 2019, 22). Another example (and one I will go into greater detail below) can be found in Nadar's artistic directors' instrumentalization of the conductor in their "curated concert" program *Extensions* (2015). Here each piece distinctly questioned the role of the conductor. As the performing ensemble, Prins and Matthyssens took the active decision to curate the concert in such a fashion that not just the works and the order of presentation were arranged, but the role, its instrumentalization, and apparent tactical deployment of one of its musicians as well.

This brings us back to the heart of this article, Nadar's performance practice and curation (and inherently thus, instrumentalization) of all the aspects of their artistic practice. I would like to discuss this further by going through two example programs, examining each for the manner in which musical and extra-musical elements were integrated into the whole as well as how the musicians applied strategies of post-instrumental practice. The first is Nadar's 2014 program titled *Dead Serious*. This was presented at the Darmstadt Summer Course for New Music in August 2014, on the Georg Brückner Platz. The program represents a close collaboration with Iraqi artist Wafaa Bilal and the belly dancer Meiver De la Cruz.

## **Dead Serious**

*Dead Serious* was an evening length show that took over the entire public square. It consisted of an introductory film, and four pieces that were each placed in different parts of the Platz, with at one point the performers standing more than 70 meters away from each other. A short video clip of the fourth piece can be seen via the link provided in the footnotes.<sup>6</sup> In the video one can see De la Cruz belly dancing with three drones. The same players who piloted the drones (non-sonic performing roles) also played traditional instruments in this program, namely cello, clarinet, and percussion. The clarinetist also played the game controller in one of the works. Furthermore, Nadar incorporated guest performers into the program, namely hot air balloon pilots for *EXIT F* (2011) by Michael Maierhof, the belly dancer, and light operators who played important roles throughout all four pieces. *Dead Serious* is furthermore an example of, among other characteristic approaches, Nadar's attacca-style concert curation. All the pieces are played one after the other with detailed, thought out, and most importantly rehearsed segues between pieces.

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6 DEAD SERIOUS (extract): Dancing with Drones (live @ Darmstadt 2014): [https://www.youtube.com/watch?v=gIz\\_pltxO2o](https://www.youtube.com/watch?v=gIz_pltxO2o), accessed on 13 April 2023



Prins and Matthynssens apply and have further developed this attacca approach because they are fully persuaded by the need to create and especially maintain an arc in a concert's program (Matthynssens 2020). Any breaks, be that for applause or technical transitions, would disturb the curated tension (Huizinga 2014) (and also disturb their active care (Grois 2022) for the audience). To create this attacca style there are many factors, both artistic and pragmatic, that are taken into consideration. In the first place the artistic arc (or tension) must be considered and that is representative in their choice of pieces and their order, presentation, and choice of players. However, just as importantly, the practical possibilities in changing between pieces are reflected upon. As discussed above, the musicians' roles are fluid and thus the individual players in each piece, in large part, remain the same. As such, the ensemble works together on getting from one position and/or instrument as smoothly and unobtrusively as possible. The production team (which also includes a few of the players) writes and leads the rehearsals of these transitions just as fanatically as if they were working on a pre-composed work, devoting precious production time to each 'change ment'.<sup>7</sup>

For *Dead Serious*, the musicians played in the first, third, and fourth pieces of the evening (the second piece, *The Patriot Act* (2014), was a film produced by Wafaa Bilal and the introduction was also a film that will be discussed below). The fourth work was for three drone pilots, the belly dancer, and follow spot operator. Nadar's scenographer and artistic team staged the belly dancer in the center of the square. The third piece, Stefan Prins' *Generation Kill* (2012), was positioned at the edge, giving the musicians, who surrounded the audience in Maierhof's *EXIT F* (the first piece), the chance to move position without being noticed by the audience. The drone pilots Matthynssens (cellist), Dries Tack (clarinetist and game controller) and Yves Goemaere (percussionist) flew using remote controls, which also gave them the chance to change positions on the sly. Furthermore, lighting and sound effects were used to draw and hold the audience's attention between works.

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7 A name adopted during rehearsals of programs that included Michael Beil's pieces (Beil 2019).



**Figure 1.** Nadar Ensemble performing *Exit F* by Michael Maierhof during ‘Dead Serious’ 2014. © Nadar Ensemble

Nadar’s idiosyncratic segues and transitions consistently seek to incorporate all required technical details (such as staging, lights, backdrops, etc.) into the style of the program. Another example Nadar program that demonstrates this approach can be found in the various iterations of the ‘Doppelgänger’ concerts.<sup>8</sup> Here, the ensemble’s musicians and crew must transition often between *Generation Kill* and *Exit to Enter* (2013), a work by Michael Beil. Both pieces have a fixed setting that is vastly different from the other. In *Generation Kill*, the ensemble sits in two rows of four musicians spaced five meters apart with the musicians sitting upstage and each staged behind a semi-transparent screen. In *Exit to Enter*, the ensemble sits bunched together on stage left, while the middle of the stage must be kept free for video recordings and projection. Because of the disparate staging, this represents one of the ensemble’s more complicated *changements*. Since both pieces use video as an instrument and because Beil admittedly was heavily inspired by the film maker David Lynch (Gielen and Moore 2023), it seemed appropriate to Matthyssens and Prins that the ensemble’s musicians mimic the filmmaker’s style and practice and record themselves doing the transition backwards during rehearsals. This recording is then played back (projected on a horizon screen) in reverse during the very same concert segue and, of course, in synchrony with the live version.

8 <https://nadarensemble.be/events/der-doppelganger/>.

Giuseppe Torre and Kristina Andersen, in their paper on designing digital musical instruments, define an instrument as a tool when it is “developed and continuously redefined by the artist to fulfil artistic and musical need” (Torre and Andersen 2017). Following this line of thought, two tests arise if one is to determine that a physical tool, performed role, or even a concert transition has climbed from utilized tool to curated instrument. First, it must be “developed and continuously refined by an artist” and, second, that development and refinement must occur to “meet an artistic need”. In regard to Nadar’s concert curation and especially transitions between pieces, Prins and Matthyssens have explicitly expressed an artistic need to maintain tension and an arc in their programs. The tools they choose includes not just the pieces in a program and their order of presentation, but the manner in which the players and technical team segues from one to the next. As discussed above, they have developed a practice of literally performing transitions. In *Dead Serious*, they did this with the help of technical devices such as hot air balloons, lighting, and drones. For example, when the drones first appeared, the pilots launched them from their seats in *Exit F* while the sound technician spread a recording of the drones’ whining sound through the octophonically arranged speakers. Practically, the musicians needed to move unobtrusively from the stages surrounding the audience to a set-up roughly 25 meters away. However, the artistic need at this point in the show allowed no lulls in sound and tension between composed works. Both the remote controls for the drones and the shifting soundtrack turned the technically required transition into an instrumentalized segue. In the example provided in the ‘Doppelgänger’ programs, the ensemble doubled themselves, turning the practical action of moving a chair or lowering a projection screen into a well-choreographed and slightly bizarre ballet. Transitioning between pieces is a requirement of concerts and Nadar has developed and continues to refine these transitions into artistically functional elements of their performances. In this sense we can then consider Nadar’s transitions in attacca-style concerts to have been instrumentalized and as an inherent part of their concert curation. Perhaps more interesting is that this transition-instrument is performed collectively by the entire ensemble.

*Dead Serious* as an event and program can also be considered an integrated concert. Not only are the transitions performed and part of the curation, so too was the manner in which the audience was welcomed to the square. As an opening act, the hot air balloons were only inflated twenty minutes prior to the beginning of the show. They were also subtly lit, drawing the public’s attention to the literally rising tension. Also, during the balloons’ inflation, a video of a top-down view of Darmstadt was shown, recorded during a hot balloon flight made a few weeks earlier. Nadar’s integrated curation of the evening further included:

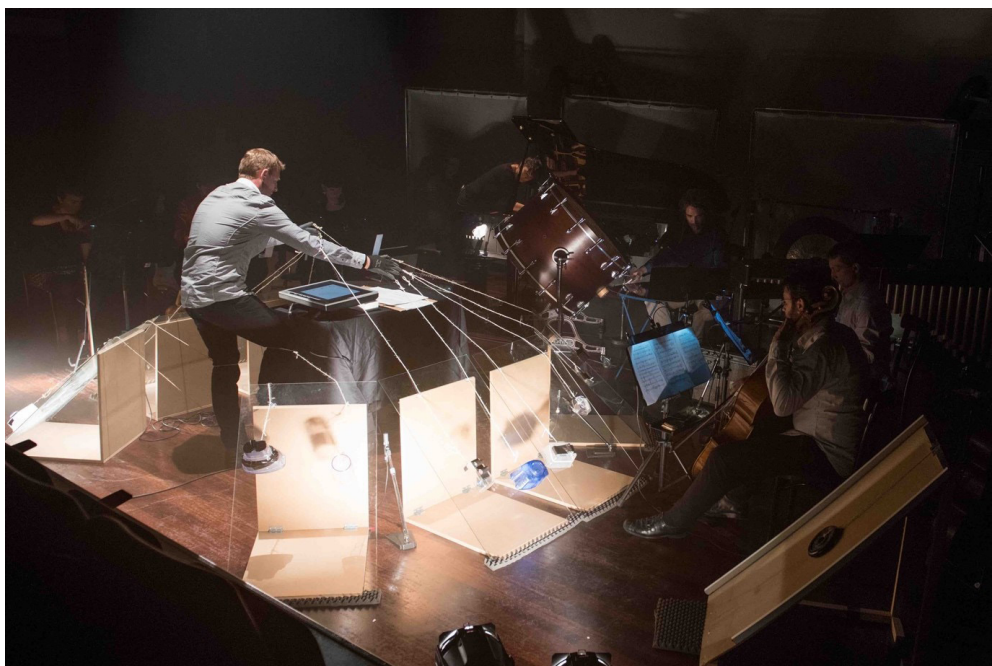
- Video: Both the material shown and the manner of presentation were taken into account during preparation. The opening film and video piece by Wafaa Bilal, *Patriot Act*, was projected on the four sides of a cube in the center of the square. The videos for the third piece, Prins' *Generation Kill*, were not only projected on original 1.8m wide semi-transparent screens, but they were also doubled on to a large horizon screen behind the musicians, allowing a larger audience to also enjoy the avatars. And finally, live video, recorded from the perspective of the belly dancer, was also projected on to the outside of the box while she was both inside the box and dancing on top of it.
- Light design: Light in this performance was not simply functional. It was used to guide the audience throughout the performance, for example, beginning with the atmospheric light provided by the hot air balloons' cannons, continuing through the overheads in *Exit F* and the foot-switch controlled LED lamps in *Generation Kill*, and finally to the follow-spotter in the piece with De la Cruz.
- Sound design: Because the ensemble and pieces were spaced around the square – sometimes performers were 70 meters from each other – the amplification was also designed by Nadar's sound engineer in a manner that guided the audience through the performance. For example, when the drones entered for the final piece of the show, a pre-recorded tape of drone sounds accompanied their flight, drawing the audience's attention to their presence.
- Décor: Nadar's scenographer and violinist Marieke Berendsen, along with the production team, specifically designed décor for the performance that would best deliver not only the four pieces, but carry the entire evening.
- Personnel: It is key to note that Nadar considered the balloon pilots for *EXIT F* and the light operators (both desk operators and follow-spotters) to be performers in their own right throughout the concert. The regular ensemble members rehearsed pieces and transitions with these performers as well as provided instructions via track-sheets, something very much akin to what Nadar's musicians could consider to be scores.

In regard to post-instrumental practice, evidence of 'technique transferral' and 'plurality' are in abundance throughout the performance of *Dead Serious*. During *EXIT F*, the percussionists play composer-made and piece-specific instruments. Maierhof wrote three percussion parts, however for Nadar's performance only one of these players was classically trained as a percussionist. The other two players transferred techniques developed on their home instruments to Maierhof's percussion instruments (including electric toothbrushes, sandpa-

pered fishing wire, sponges, and thick plastic cups), ‘exploring and executing’ piece-specific performance practices. During the work with the belly dancer, the three drone pilots, also musicians in the ensemble, took on ‘non-sonic roles’ demonstrating a ‘plural’ post-instrumental practice. And lastly, during *Generation Kill*, (which will be discussed in greater detail below) all four game controllers found ways to transfer their expertise on their main instruments (respectively: piano, flute, violin, and clarinet) to playing Sony PlayStation 3 controllers.

## ExTensions

The second example I would like to discuss is the concert program *ExTensions*, premiered by Nadar at the Gaudeamus Muziekweek in 2015. The ensemble opened the program with Alexander Khubeev’s *Ghost of Dystopia* (2014, rev 2019), pictured below. Second on the program was Simon Steen-Andersen’s *AMID* (2004), from which you can see the Gravity Guiro<sup>9</sup> pictured in the bottom right corner of Figure 2. The third piece was Alexander Schubert’s *Point Ones* (2012). And the final work on the program was Stefan Prins’ *Generation Kill*.



**Figure 2.** Nadar Ensemble Performing *Ghost of Dystopia* by Alexander Khubeev at the Gaudeamus Muziekweek. © Anna van Kooi

9 A full description of the instrument can be found in the score (Steen-Andersen 2004).

The first three pieces on the program have a unique role for the conductor and it was the explicit intention of the concert's curators, Prins and Matthynssens, to question the contemporary role of the conductor within the context of the Western art music genre (Matthynssens 2020). As with the segues in the previous example, here the artistic co-directors instrumentalized the conductor to meet their specific artistic and curatorial goal. This is especially apparent in the Schubert and Khubeev, in which both composers created new instruments (and new notational methods) to bind the conductor to respectively create a tension between reality and the virtual world and, in the latter case, to tell the story of a rise and fall of a dictator (Moore 2021).

In Alexander Schubert's *Point Ones* the conductor's movements fulfill two sometimes simultaneous functions. They are choreographed to trigger live electronics and are utilized to conduct the live ensemble. Both sets of gestures, those choreographed and the conventionally employed, fall within the realm of generally recognizable movement repertoire (Schuller 1998). The latter functions as we might expect in a performance ritual (Schwartz and Godfrey 1993); the conductor's gestures mark time and cue the musicians who then respond accordingly. The choreographed and electronic-cueing gestures also look like normal conductors' movement repertoire. However, they are instead deployed to trigger live electronics. By instrumentalizing exactly these conductorial key gestures, the conductor's conventional responsibility to direct and cue the live musicians has not been limited, but rather augmented and enhanced. Their gestures cue both live performers and trigger virtual musicians, sometimes at the same time (Moore n.d.).

In the opening piece, Alexander Khubeev's *Ghost of Dystopia*, the role of the conductor is instrumentalized as the subject of the piece in order for the composer to tell his tale of the rise and fall of a dictator (Moore 2022). The conductor-soloist begins the piece bound hand and foot to a composer-made instrument. As the piece progresses, he/she breaks the bindings and, using conducting-like gestures, appears to take charge of the ensemble. As the piece comes to an end, Khubeev has the conductor take up a Christ-like pose, purposely begging the questions, 'Is he dead? Who killed him? Is he a god?' Though Khubeev attempts to make it appear as though the conductor continually finds more freedom, it is only a veneer. In an interview, Khubeev admitted that "the more freedom [he] wants the audience to see, the more he dictates" (Khubeev 2019) the role to his performers. Khubeev, therefore, was very clearly willing to instrumentalize and develop the role of the conductor to meet his artistic needs.

*AMID*, the oldest work on the program, is arguably a preface to Steen-Andersen's self-described 'hyper-concrete' (Steen-Andersen 2010) manner of composing (Steen-Andersen 2019). Hyper-concretism is the practice of tenaciously applying the same technique and playing method uniformly across a range of

instruments. In *AMID*, Steen-Andersen first rationalized the winds' breathing in percentages, which were then directly transcribed to each of the other five instruments. For the strings (violin and cello) that was articulated as bow movements. For the piano and guitar, the composer used range. And for the percussionist, Steen-Andersen designed a new instrument he dubbed the Gravity Guiro in which the player must raise and lower a weighted piece of sandpaper across an incline. Each instrument was assigned a full potential (100%): full lungs for the winds, at the frog from the strings, low registers for the piano and guitar, and at the top of the incline for the percussionist. They were also assigned a 0% potential that is respectively the opposite for each instrument. In *AMID*, the composer zoomed in on, applied, and employed the musicians' movement repertoire, turning what is normally associated with preparatory and production gestures into the musical material itself.

Steen-Andersen's compositional practice is applicable to not just writing music, but also to performing it. For Nadar Ensemble, this has conceivably become a central pillar in their artistic practice as an ensemble and also serves as an example of post-instrumental practice. By applying a hyper-concrete 'transferral' of instrumental skills, the musicians can switch dexterously between instruments (which are mostly composer made) and the respective new styles of notation. Furthermore, they apply the embodied and ingrained skills gained on their principal instruments (such as breath control and coordinated timing) to both live electronic instruments and even more non-conventional instruments such as light switches and non-sonic roles like show-calling.

The final piece on the *ExTensions* program was Stefan Prins' *Generation Kill*, pictured below. In this piece, I am often fascinated at the manner in which each of my colleague game controllers hyper-concretely applies their personal instrument techniques to the 'new' instrument. Elisa Medinilla, the pianist, for example, wrote all the finger settings for her game controller into her part as if the instrument were truly a piano. Dries Tack and Katrien Gaelens, both woodwind players, did something similar. The three wind players, myself included, also applied breathing structures to help play in a more chamber music-like fashion. It is key to note here, that each of the musicians accepted the game controllers as their instruments. They bought the computers, sound cards, game controllers, and webcams to use and practice at home, practicing in the concert conditions. The musicians do not view the electronics as something extra that a technician will handle and play. Instead, they all view them as their personal responsibilities and take the initiative in finding and practicing the material. For all four pieces in the *ExTensions* program, all the new instruments were practiced at the players' homes (or in the case of the Khubeev at the ensemble's rehearsal space) in concert conditions. This may sound simple, but of course it takes time (and precious funding) to realize.



**Figure 3.** Nadar Ensemble performing *Generation Kill* by Stefan Prins at the Gaudeamus Muziek Week. © Anna van Kooi.

Nadar's program *ExTensions* is a straightforward example of the instrumentalization of one of its musicians' roles, namely the conductor. Schubert and Khubeev explicitly developed the role for their artistic ends, and in *AMID* Steen-Andersen deployed musicians' movement repertoire as a compositional tool. Though the role of the conductor was not originally envisioned, it has become the common performance practice for the piece (Steen-Andersen 2019). And since the conductor can only use movements, it is arguable, in the words of Matthynssens, that the "conductor's movements become a visual extension of the musicians" (Matthynssens 2020). Furthermore and as mentioned, Prins and Matthynssens specifically programmed and curated these three pieces as a way to explore the dimensions and complexities of conducting new music today. They began with the Khubeev, literally chaining the conductor to the stage before the audience entered, knowing as well that the freedom gained throughout the piece is simply an illusion, thus immediately questioning "performance ritual" and contemporary understanding of hierarchy on stage (Schwartz and Godfrey 1993). *Point Ones* was the second piece presented and, in Nadar style, it was played *attacca*. In other words, while the conductor may now have been free of Khubeev's instrument, he was charged with immediately banging off into the rock'n'roll-style introduction of *Point Ones*. Unlike the first piece, Schubert's bindings are far less restricting. However, specific composer-made choreography does make up roughly 80% of the piece (Moore n.d.). In *Point Ones*, the conductor becomes an instrument to question the tension between the virtual and real in our daily (musical) lives. The question posed in *AMID* is more subtle. Here, he/she fulfils a role closer akin to a chamber-musician (Boltanski and Thévenot 2006) helping to articulate and highlight physical gestures as musical sound.



These three uses of the conductor and their piece-required performance practice are also direct evidence of post-instrumental practice. Khubeev and Schubert required the conductor to learn a new instrument, one electronic and the other acoustic. The performance practice for *AMID* is also quite restricting, requiring the conductor to match specific patterns and timings to the musicians and leaving little to no room for spontaneous artistic interpretation or even correcting gestures (Moore and Gielen 2021). If we understand the practice of conducting to have a basic and trained skill set (Schuller 1998), then each of these three composers and the curation thereof appears to choose which (available or created) skills are required for their pieces and program and then are reassembled, à la carte, to meet their artistic needs.

This tactical deployment of the conductor also demonstrates a key component of integrated concerts, in which multi-disciplinary elements are implemented into the curation of a concert. Besides the clear curation of the conductor's role, Nadar also integrated costuming in *Generation Kill*. Here the musicians must match their pre-recorded avatars in all possible detail, including clothing, instruments, and even haircuts. Lighting and scenography were also designed and integrated in the program for all four pieces on the program. The conducted works were integrated into one stage setting (a traditional U-form), however the lighting for each piece was designed to highlight the players, draw attention to specific instruments, and enhance the artistic vision of each composer. In Khubeev the spider-like glass plate instrument was lit from below, creating shadows of the plastic boxes and the conductor on the ceiling and walls of the venue. In Schubert, the musicians were back lit, turning them faceless players. And in *AMID*, each player was isolated from the rest with top spots to emphasize each sound and movement. And lastly, the curators' intention to integrate extra-musical elements into their presentation of the concert program is demonstrated by their decision to begin the program with the Khubeev, in which the audience is presented upon entry with a bound conductor.

### **This is my Instrument.**

As a performer in Nadar Ensemble, I think perhaps the defining element of our performance practice is that each of the players claims or owns each new instrument presented. In *Dead Serious*, not only did Matthynssens, Goemaere, and Tack learn to expertly fly the drones, they learned to dance with them, acting out both a scripted scene as well as gaining enough proficiency with the instrument to improvise with an experienced belly dancer. For two of the examples cited from the concert program *ExTensions*, *Point Ones* and *Ghost of Dystopia*, I personally spent many months in the physical concert setting of both

Schubert's electronics and Khubeev's bindings. I, too, became proficient enough to improvise comfortably on both and can now (for reprisals) practice them outside of the setting, visualizing the feeling of each instrument. Each new approach cited here demands significant study and ownership on the part of the player involved. Though not specifically cited by Devenish (or Stene), ownership seems to be inherent to post-instrumental practice and 'technique transferral' which, to repeat, is a "development of performance practices specific to individual works, rather than individual instruments". To develop piece-specific performance practices, the musicians of Nadar have persisted in claiming these instruments as their own, drawing on previously created expertise to incorporate them into each musician's artistic practice.

Regarding integrated concerts, Nadar's artistic co-directors, Matthyssens' and Prins', have an approach towards concerts and the ensemble that is founded on caring for the audience. The two cases cited above suggest that this has created an intrinsic need as artistic directors of an ensemble to curate a broad array of aspects of the concert program, including the personnel of the ensemble, their roles, lighting, sound, and video design, décor, and most importantly creating segues that become part of the artistic presentation itself.

On a final note, the instrumentalization of roles and musicians' movement repertoire, skills, expertise, and abilities discussed in the two cases above has for the most part appeared to not only grant more artistic freedom and stability to the instrumentalizers (composers and artistic directors), but also to the musicians themselves. As composer Michael Beil noted in an interview, he "writes [pieces] for certain people. People [he] knows well" (Gielen and Moore 2023), making each player essential to any further reprisal of a show. In other words, the flexibility demanded of the musicians allowed the composers and artistic directors to explore new artistic horizons while also offering, by consistently working with the same team and simultaneously pushing them to expand their own (post) instrumental practices, socio-economic stability.

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**THIS IS MY INSTRUMENT:  
AN APPROACH TOWARDS PERFORMANCE PRACTICE FOR INTEGRATED  
CONCERTS  
(summary)**

This article serves as an introduction to Nadar Ensemble, a Belgium-based new music ensemble known for their innovative approach to ‘curated concerts’. Led by artistic co-directors Pieter Matthyssens and Stefan Prins, Nadar Ensemble actively explores the integration of video, scenography, and lighting as integral elements within their performances. The ensemble’s core members have embraced a diverse range of instruments, including unconventional choices such as balloons, IKEA baskets, and dog clickers, showcasing their versatility in exploring unique sound production techniques. Moreover, the musicians have expanded their roles to include non-musical responsibilities, such as operating drones, managing smoke machines, and show-calling. In this article I will emphasize the ensemble’s deliberate selection and development of various performance components, which have become inherent to their artistic identity. I adopt the term ‘integrated concerts’ to describe these meticulously curated events which encompass video, lighting, sound design, stage design, as well as the roles of its players, all thoughtfully interwoven to create a cohesive experience for the audience. Nadar Ensemble’s commitment to incorporating multiple dimensions and instrumentalizing roles is studied as a means of further exploring the artistic directors’ artistic vision. Furthermore, I will briefly delve into the ensemble’s strategic instrumentalization of the conductor’s role, emphasizing how it enhances the visual and tactical dimensions of their performances.

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## **THE POLITICS OF CONNECTIVITY: BETWEEN CELEBRATORY AND CRITICAL APPROACHES**

**Abstract:** This paper discusses the role of connectivity in networked artworks and performances, and attempts a critical approach towards the condition of connectivity. As a starting point, three artworks will be discussed as the main case studies: the online project Xenakis Networked Performance Marathon 2022; 2023Eleusis Mystery 91\_Magnetic Dance in Elefsina European Capital of Culture, and; Spaces of Reflection offline PirateBox network in the 10<sup>th</sup> Berlin Biennale. Among the theoretical tools used here Deleuze and Guattari's aesthetic theories can be traced, as well as more contemporary reflections on networks and the omnipotence of connectivity today. Furthermore, the role of institutions, funding operators and corporations will be examined in regard to their agency and intentions.

**Keywords:** performance, live coding, connectivity, network, telematic, geo-location, offline.

### **Introduction**

Connectivity through today's technological possibilities is often seen as the holy grail of contemporary artistic production. Very briefly, connectivity is everywhere: the Internet, fast communication, data exchange and transfer, social networks, interactive media, and interactivity in general. The literature on connectivity spans from before the Frankfurt School (Adorno 1991), with mass culture

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at its core, through Marshall McLuhan (1962, 21) and the foretelling global village, to rapid contemporary developments and the corresponding plethora of media theory and aesthetics. It is a fact that we have the ability, more than ever before, to connect online and in total synchronicity, so as to produce artistic works together, regardless of our geographical location and time zone. The issue of simultaneous creation is appealing and interesting, creating the new “participatory” on a global scale. Furthermore, the process of synchronicity creates online communities that are carved together in creative adventures, constituting a global (artistic) village (McLuhan 1962, 21). Certainly such exigences existed previously, but the simultaneity of these projects nowadays creates global and universal artistic fermentations, ready to produce international artistic currents, and exchanges of knowledge and practice in total fusion.

However, things have become much more complex since Pierre Lévy (2001, *passim*) celebrated the new possibilities, tools and forms created through the democratization of information. By affirming that “systems of governments still use molar technologies of communication” and that “administration is most frequently based on traditional management techniques” (Lévy 1997, 60) the author had in mind earlier stages of the Internet and computational technologies. But today connectivity is recaptured by the assemblages of power in every aspect of everyday life. Connectivity has been transformed from a tactic of connection and communication to a strategy of surveillance, biopolitics, and profiling. In this system of connectivity, we have all become products, profiles, customers and content creators, regardless of our intentions.

In this article, I wish to study three cases of artistic connectivity, on the one hand while understanding and sharing their celebratory agency, and on the other by critiquing the effectiveness or usefulness of this connectivity in contemporary art. Although my point is critical throughout the text, I did participate in these projects, with great involvement, both as a creator and as an organizer. The reason for my critical approach is not so much to highlight the negative aspects of the projects. On the contrary: I wish to reflect on issues that concern me, issues pivotal to technological art. Exploring these issues can make us improve our relationship with technological art making, not on a pedantic level concerning others, but in a self-critical mood concerning ourselves. In short, here I attempt a reflection on projects in which I have participated, choices I have made and stances I chose along the way. But self-criticism, the awareness of our own positionality, the thorough study of our affect and effect as artists and researchers, is, in my opinion and at this moment in my life, a rich way to enrich thoughts and actions further. Finally, as the stakes are social art, I believe that the only honest thing to do is to constantly question the impact of one’s artistic production and the engagement of society at large in it. My critical disposition stems from my willingness to continue to create and explore the consequences of that creation.

### Three case studies

While being both a theorist and artist, and as I have contributed to the production of all three of these works, with different involvement each time, I must state here that the conclusions of this article will be mixed and intertwined, as my own positionality lies between the two approaches. I stand in between the two methodological and conceptual propositions, as a dilemma between good intentions and internal contradictions. The study of these cases comes from an autoethnographic perspective, as my entire artistic career revolves around technology and its combination with art.

This combination is of course not new. From Leonardo Da Vinci's early technologies, to Wassily Kandinsky's microscope paintings, tape music, bioart, the whole history of art in short, the relation between creation and technological possibilities has always been a point of intersection, inspiration and experimentation. Mass media and electrical inventions augmented this convergence. Technological advancements in past centuries have helped to design and implement more general communication systems. The idea of a computer network was proposed in 1961 by Leonard Kleinrock, in his doctoral thesis proposal on the flow of information to large-scale communication networks (Kleinrock 1961). This idea led to Project ARPANET, a larger networking project based on a survey of the U.S. Department of Defense in the 1960s, under the leadership of Robert Taylor and Lawrence Roberts. ARPANET quickly became the starting point for the development of a hypernet, in which individual networks could be connected to a network of networks. Over the next decade, several countries and educational institutions would put a lot of effort into implementing various communication protocols: packet switches, NPL network, ARPANET, Merit network, CYCLADES and Telnet. The Internet Protocol suite (TCP / IP) developed by Robert E. Kahn and Vint Cerf in the 1970s combined protocols from ARPANET and from the French CYCLADES project by Louis Pouzin. Slowly, the idea of networking was to be found everywhere, from the war industry to artistic production, education, and entertainment.

The case studies studied here are based on this connectivity, online information exchange and networking in the field of contemporary art. Through their study we will be able to explore the artists' intentions, their relationship to the history of networks, their participation in contemporary theoretical and artistic dialogues, and their position in relation to connectivity in the artistic creation, presentation and promotion of artwork. They will serve as an occasion for reflection on the role of technology in contemporary aesthetic theories and artistic creations.



First, the project **XNPM22 Xenakis Networked Performance Marathon 2022<sup>2</sup>** took place on December 16<sup>th</sup> 2022, and was an homage to the Greek pioneer composer and thinker Iannis Xenakis, as an event dedicated to his memory, his work, and his reflections on science and technology. The work was available both on site in Athens Conservatory, and online through live streaming<sup>3</sup> of 8 hours in total, and was created in the framework of the centenary celebrations for the birth of Iannis Xenakis, by the Performative Environments Arts Research Lab (PEARL) at the Department of Audiovisual Arts of the Ionian University, in collaboration with Athens Conservatory and the Meta-Xenakis Meetings consortium. During this marathon, works were performed simultaneously at the Athens Conservatory, as well as in other places worldwide. Control data were transmitted through the Internet, resulting in coordinated sound and dance performances between different locations. It included sound and performance data from live coders, score creators, instrumental performers, dancers, and installation artists working with many media formats, while the main data format was Open Sound Control (OSC) broadcasting via OscGroups, with parallel video streaming. Participating performers were located in different parts of the world, while performances took place on the stage of Athens Conservatory.

A commentary on connectivity is worth starting from this project, as indeed the project is the epitome of connectivity. It managed to bring together numerous artists, programmers, composers, technicians and performers from all over the world, who performed the works in real time and remotely, with simultaneous participation of other artists on site, connected via the Internet.

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2 Xenakis Networked Performance Marathon 2022 team consisted of:

1. The HAL Research Project and Lab PEARL staff, namely Iannis Zannos: Concept and Art Direction - Martin Carlé: Production and Sensor Development - Vasilis Agiomyrgianakis: Sound Design and Production Assistant - Thanasis Epiteideios: Production Assistant - Tania Tsiroidou: Video Production Assistant - Minas Pergantis:, Roubini Oikonomidou: Web Presence and Connection to AVARTS Video Streaming on Youtube,

2. The Athens Conservatory, namely Νικόϋ Αθιναίος: Overall Coordination and Direction at Athens Conservatory, Lila Zafeiropoulou: Choreographic Supervision and Concept, Stella Kourbana: Coordination with Meta-Xenakis Consortium, Katerina Tsioukra: Press and online presence,

3. The MA in Digital Arts, Athens School of Fine Arts, namely Vicky Betsou: Video Production, Nikos Dalezios: Video Production Assistance, and MA in Digital Arts Students: Pericles Andonarpoulos, Sofia Damala, Eleftherios Delimbasis, Eleni Dimopoulou, Leda Zacharopoulou, Stella Kavagiou, Ioannis Karalis, Thanasis Kafetzis, Mirto Kokkinou, Panos Mazarakis, Georgia Mandalia, Dimitris Papadopoulos, Isidoros Plakotaris, Evangelia Raftopoulou, Stratos Serafeimidis, Eirini Tambasouli, Valentina Farandouri.

4. Independent collaborators, namely Dimitra Kousteridou, Georgios Diapoulis, Stefano Kalonaris.

3 Athens Conservatoire (2022). Xenakis Networked Performance Marathon 2022. Last accessed on February 15th 2023, <https://www.youtube.com/watch?v=fiCT-nLdXdU>.

It is impossible to mention the description of each project individually, as more than 50 performers, technicians, composers and artists participated in the networked marathon, very often with several roles each. Initially, the project was an ambitious undertaking which largely achieved its purpose. On the one hand, the timing of the project around the 100<sup>th</sup> anniversary of the birth of Iannis Xenakis gives a significance to its realization by the Athens Conservatory and the PEARL laboratory of the Department of Audiovisual Arts of the Ionian University. Conceptually, this synchronicity and connectivity would have appealed to Xenakis, based on his work and texts, through the political, cosmic and technological connotations he gave to both.

Furthermore, the creation of this online community was indeed emphasized throughout the media and social networks promotion of the project, as well as in the introductions by the organizers. However, more concrete reflections on connectivity were not evident in the core of the presentations. Even the artworks that addressed the struggles of contemporary humans and societies did not mention top-down connectivity and how it could possibly contribute to those struggles, or the tyranny of constant and omnipresent networking in any way. Connectivity appeared with the connotation of the ethically “good”, as an impressive achievement that artists are experimenting with in order to explore new technological possibilities. This viewpoint resulted in works using connectivity without ever thematizing it. On the one hand, it makes sense to use all media available rather than problematizing them in absolute terms. On the other hand, there were projects which clearly could elaborate more on a critical perspective, and possibly would have done so if there was room for this to be addressed further. Beyond all of the above, the project managed to resonate and address, as well as raise issues of connectivity, with the presence and absence of dialogue around this condition.

As for the second case study, things are quite different. The artistic project **Mystery 91\_Magnetic Dance**<sup>4</sup> carried out its first turnover in the context of the actions of the Elefsina Cultural Capital and the Spring Forward Festival, under the artistic supervision and guidance of Iannis Zannos and the production and supervision of the company To Aesthate G.P. The project is a series of digital art events that concern the communication of body and technology through remote communication: the dancers’ body is connected with a computer through sensors while it transfers movement data online, as well as to remote users between them. It is based on the idea of embodiment and embodied action, telematic

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4 The work is part of 2023 Elefsina Cultural Capital of Europe and was introduced to the public in an open rehearsal attached to the Spring Forward Festival. The artistic team is: Iannis Zannos | with the participation of Natali Mandila, Tasos Pappas-Petridis, Jun Takahashi and Asayo Hisai, Haruka Hirayama (composer/computer music professor), Hideaki Isobe (sound artist), and Akoo.o sound art team.

improvisational creation, telepresence in the technologically territorialized and reterritorialized space of the Internet, as well as the relationship of human and machine as a single body. The project is informed by innovative technologies that combine the logic of open source and the free, creative sharing of media and tools, through the logic of copyleft. The main goal is to connect the cultural importance of Ancient Eleusis, as the place where the Eleusinian Mysteries were performed, with new practices of performing digital arts through open source and performance practices. It approaches the cultural dimensions of technology sharing practices in a free and open way, through the prism of performative practices of artistic expression. Lastly, a series of geo-located audio walks were created for the entire city of Elefsina by the Akoo.o team, connecting the aural history and reality of the city with the sound outcome of the performances.

On a technical level, a sensor system was created and supported for tests with audio and graphical environments to establish operational control of programming environments for telematic use of a prototype wearable-wireless sensor system. The goal was to ensure control, processing and transfer of data to other devices in order to produce sound and graphic environments' remote collaboration. More specifically, this prototype wearable sensor system was installed to send data from sensors that combine a 3-axis gyroscope, a 3-axis accelerometer, as well as eight buttons for selecting sounds and graphic environments to remote servers (Agiomyrgianakis 2021). This way, the dancers were producing the sound themselves, translating movement into sound, or manipulating the parameters of pre-chosen sounds.

In this project connectivity happens on the ground. Even though the data came and went through remote servers, all the dancers and composers were in the same place. This connectivity was in fact an "aesthetic connectivity", pertaining more to the connection between human and technology, body and spirit, composition and embodied practice. It would not refer to the connection of people or a community of artists, as was the case in the previous work, rather to the intercommunication of different artistic disciplines within the same artwork. Thus, the dancers become improvisers on the very music they compose, while the composers control the sonic qualities based on the body and movement of the Other, as an embodied co-creator of abstract concepts.

Even this purely aesthetic level is useful and has a political dimension, which need not be overlooked. "Aesthetic connectivity" changes the way we see art, both from the inside and as an audience. It reduces the boundaries between audience and performer, between man and machine, between sound and movement, and between artwork and everyday life. But at the same time, thoughts arise about how obvious this process becomes to the audience watching this process, how apparent it becomes to them what is happening on stage. Does the audience really understand the technological and conceptual connection be-

tween idea and implementation, or is it indifferent / unintelligible / inaccessible to them, even when it is happening in front of their eyes? Does it matter to the audience when they are watching the play? How does the audience perceive the technological connections if they don't read the text that accompanies the action? Here, questions are raised about public access in relation to the conceptual and technological framing of the artistic work, and the popularization of artistic research.

Finally, the last case study is the project **Spaces for Reflection**<sup>5</sup> which was presented in the context of the educational activities of the 10<sup>th</sup> Berlin Biennial. Although the broader project was multidisciplinary and concerned the constructive critique of institutions and mega-exhibitions, the offline network sub-project that will be used here as a case study is the most relevant to the topic of this article. Among the various workshops, presentations, discussions and artistic interventions, Spaces for Reflection decided to use and include a detailed discussion on PirateBox during the Berlin and Athens Biennials, by setting up an offline network in the two spaces and engaging in dialogue with visitors and participants. To do this we set up a router with PirateBox code, an opensource code that is inserted into the router and creates an offline network, or local network. On this network people could only connect locally, meaning it has no international reach. The reach was the KW building and the surrounding streets. At the same time, there were open discussions with the public at organized times and days, but also with various visitors on a one-to-one basis.

The group decided to use the PirateBox code, but, instead of buying a ready-made router as suggested on the PirateBox site, a Raspberry Pi was easier to be found and coded accordingly at that time. The group was inspired and guided

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5 Spaces of reflection was a collective project that included reflective thought and action about artistic mediation. Students, artists and researchers coexisted as part of a permanent intervention that explored "the perception of visitors and the possibilities of public participation in mega-exhibitions of contemporary art", from Documenta14 to the 10<sup>th</sup> Berlin Biennale, We don't need another hero, and the 6<sup>th</sup> Athens Biennale, ANTI. The group was formed at the initiative of Mona Jas between students from the Kunsthochschule Weißensee and the Humboldt-Universität zu Berlin, artists from Athens and Berlin and researchers from the Documenta14 chorus group. The first meeting took place at Goethe Institut Athen and the group created its own dynamic through networking and various meetings in Athens and Berlin. The group presented its work at the 10<sup>th</sup> Berlin Biennale to the KW Institute for Contemporary Art Kunst-Werke studiolo in August 2018 (organized by Mona Jas and the artistic mediation and education department of the 10th Berlin Biennale), as well as at the 6<sup>th</sup> Athens Biennial at the Esperia Palace (organized by Eva Giannakopoulou in a co-production of the Athens Biennale and the Goethe Institut Athen). The team of Spaces of Reflection consisted of various artists and researchers: Jasmee Adeoshun, Magdalena Beger, Vivien Emmanouilidou, Sofia Grigoriadou, Maria Janus, Alexia Manzano, Dana Papachristou, Harriet Rabe von Froreich, Yorgos Samantas, Liz Stumpf, Simon Bejerholm Villadsen, Myrto Vratsanou, Silke Wittig, and visitors Giannis Sarris, Simon Johnson and Mattin. <https://bb10.berlinbiennale.de/calendar/spaces-of-reflection>.

to use PirateBox by artist Giannis Sarris who had also used it as part of Documenta14, curated by Adam Szymczyk, for the performance Social Dissonance by Mattin. Raspberry Pi programming was successful with the invaluable help of programmer, game designer and artist Simon Johnson.

PirateBox,<sup>6</sup> as an offline network has ceased to exist, although the code remains free. Matthias Strubel started working on PirateBox in 2011 as an open source project. By 2019 Matthias Strubel had gradually left the program, although the blog hasn't yet ceased to exist online. The reasons for his decision are many. As he explains: "in the year 2016 FCC changed the rules about firmware security, resulting in more locked router firmware, HTTPS everywhere is kicking PirateBox' butt with the redirect everywhere, all the technical enhancements for user security made us go one step back, [...], the amount of spam increased tremendously" (ibid.). Although the forum is closed and some services will eventually stop, their space in GitHub, "a provider of internet hosting for software development", will stay online and there is also a call for volunteers to take over the project, while there is an active reddit post.<sup>7</sup>

During both of the Spaces for Reflection presentations in Berlin and Athens, an offline network was available to visitors and participants to facilitate connectivity through the router. Each visitor could select the network from the device's network list, connect and browse the local network environment. This platform included a simple chat and provided facilities for uploading photos and sharing files, as well as for simultaneous communication and editing. In addition, the group organized presentations, demonstrations and discussions around the theme of the use of this network and the reason for their choice to set it up and make it available in such a context. The offline network created was very useful throughout the exhibition as it was used to store images, exchange opinions, and upload an illustrative bibliography, which helped all other Spaces for Reflection activities. But the most interesting point was the discussions that followed the interventions. Most visitors could not see the usefulness of this network and why it could replace a website or a closed group on a social network. Some believed that a closed group of participants in a communication app like WhatsApp, Messenger or Trello would do the same job. Finally, there was a great deal of suspicion about their data entry when interacting with the network offline. This made them suspicious of what they could write or download on the network chat, as they were worried that their actions would remain stored on the Raspberry Pi.

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6 PirateBox remains on the internet as a read only forum, last accessed on April 5th 2023 <https://forum.piratebox.cc/read.php?9,23070>.

7 <https://www.reddit.com/r/Piratebox/>.

In this case, the connectivity of the local network was complementary to the connectivity properties available analogously or without any technological mediation. One of the most legitimate questions from the audience during the discussion was “why should we initiate a dialogue on the offline chat if we are already in the same room”. The argument was that the local network created an archive, so each visitor could not only chat in space but also in time: be informed about previous visitors; leave a message for future ones; or create an active library. Finally, participants were very suspicious about the fate of their data: They felt that the lack of a regulatory context made them feel vulnerable, and they believed that companies like Google, Facebook and others actually act under a regulatory context that protects them from theft or malicious use of their data.

### **Captured and recaptured**

When talking about the network and connectivity, we can look back on the Deleuzian and Guattarian notions of the rhizome. Indeed this theoretical juxtaposition is very widespread. But is the Internet always a rhizome? Does the principle of connection and heterogeneity apply in all networked conditions? Can all the points of the network be connected with each other (Deleuze 1987, 13) like a rhizome, and does the principle of multiplicity always apply (ibid., 14)? As the only unity a rhizome can acquire comes from the signification and subjectification, then we could say that the Internet is a different kind of connective condition, that may or may not be [overcoded – surcoder] (ibid., 15). The fact that this type of connectivity often requires a dominant unity, from corporate regulations and servers to straightforward content control, renders the Internet a structure that is characterized depending on the use. What is most interesting to me in this article is whether or not connectivity can contain and nurture lines of flights. And ultimately, if the network itself is capable of enabling the creation of new rhizomes through accommodation, tolerance and reinforcement of lines of flights. Could it be that the Internet connectivity rhizome is a consolidated-rhizomatic form that appropriates the properties of the rhizome, while depriving all connective conditions of their agency and dynamic?

Lines of flight are powerful drives that are released from a network, whether this network follows arborescent structures or rhizomatic connections. Indeed the Internet consists of lines as a rhizome does (ibid: 16), and contains numerous overlaying lines. But these lines require subjectification, organization and the consolidation of subjects or the formation of multiplicities. We could affirm that the internet corresponds with the rhizomatic principle of the asignifying rupture (ibid: 16) and the principle of cartography (ibid., 20). Moreover, it is constructed by lines of segmentarity, according to which “it is stratified, territorialized, organized, signified, attributed, etc.” (ibid., 16-17) and it is based

on multiplicities (ibid., 20). But on the other hand, it often creates dualism and dichotomy, while it sometimes lacks multiple entries. The most important part is that it often requires a centralized power, while the produced lines of flight in fact lack meaningful possibilities of “flight”.

We could not deny that the Internet is a powerful agent of change, and that it has the potential to be a war machine precisely insofar as it maps out “a plane of consistency, a creative line of flight, a smooth space of displacement” (ibid., 422-423). The Internet could potentially facilitate the creation of other rhizomes, and it has done so in many cases. On a theoretical level, its lines of flight or deterritorialization possibilities can create multiplicities and change their nature to connect with others (ibid., 16). Through new technological forms and possibilities, there could be a nomad art as itinerant, minor, ambulant art and science collision (ibid., 372), constituting a war machine, acting against the apparatuses of capture and dominant practices. The common line of flight of the weapon and the tool (ibid., 398) could be reinforced through networked connectivity in contemporary art.

However, the outcome depends on the relevant agency. Art can also turn into a war machine of minor form that favors the requirement of the asubjective, of the asignifying and the anorganic (ibid., 279). But, a mere line of flight is never enough: Space can be re-striated, lines of flight can lead to points of consolidation, nomadism can be left meaningless, and the war machine can be used by the power assemblages it originally escaped from. An ambulant and minor artistic gesture is in constant danger of being appropriated by the apparatuses of capture, to form the establishment of a new empire (ibid., 436). The state apparatus can capture the war machine or turn it against itself and the artists. It is thus a requirement of artistic connectivity in general not to create assemblages of power corresponding or identical to those it “flew away from”, by losing its speed and its smooth space to the advantage of the consolidated and the striated in its royal form.

What is the sedentary today, and what perils of recapture does art face today, and in particular in the aforementioned artworks? In these case studies, all of the artworks had the exigence of using rhizomatic connectivity and of creating minor art. The question is how recapturing works in these cases, what is centralized power here, and how does it affect our lives as artists, creators or audiences. In my opinion, when all these practices [DIY, open source, freeware] become appropriated by large institutions, corporations, or funding mechanisms, then they lose the dynamic of their creation in the first place. They are utilized by institutions as free tools that assert their position within a generalized media mediation, as royal art versus nomad and minor art, as well as in creating artistic empires. At the same time, as artists we eventually become testers of technologies, regardless of our intentions, before they are used as tools of generalized

surveillance and digital governance. Conditions are thus created where lines of flight become recaptured, stop “fleeing / flying” and remain in a sedentary and established condition. Eventually, as has always been the case in the history of art, we are urged to invent other lines of flight, new and ever fugitive. The story may go on forever, but this realization in the contemporary technological environment takes on additional meanings: Art can function as a weapon and tool against arborescent and sedentary structures, who are consolidated so as to lead to generalized digital and inherently oppressive mediations, and this is an opportunity that shouldn't be lost.

## Conclusion

While contributing to a wide-ranging discourse on the aesthetics of our time, the aforementioned perspectives regarding the radical potential within the arts should not be regarded as fixed standpoints. They are not presented here merely as opposition to the discussed case studies, solely from a critical standpoint. To some extent, the aforementioned artworks have effectively highlighted “the potential of technology to support international collaboration in artistic creation, to create works that are performed live in multiple venues simultaneously regardless of distance, using new experimental media that allow for direct communication and exchange of musical data”,<sup>8</sup> as stated in the project description of XNPM22 on the conservatory's YouTube channel. However, the critique arises precisely from these accomplishments. Is connectivity alone sufficient? Does the mere existence of connectivity warrant a celebratory stance? Can we rely on its presence to discern transformative changes and radical necessities in our era?

In my perspective, the potential of connectivity today is not inherently revolutionary, considering its extensive utilization by the harshest aspects of capitalism and prevailing economic policies. We cannot solely celebrate the technical capabilities of widespread connectivity, as the practices of crowdsourcing within networks contribute significantly to pervasive surveillance and constant lifelogging (Puar 2017: 4). It also fuels anxiety, which has become the dominant effect of contemporary capitalism (Institute for Precarious Consciousness 2014), and plays a role in global digital governance. These aspects represent the epitome of connectivity in today's context, serving as the primary strategies of power structures. The incorporation of connectivity into undermining the influence of these power structures may depend on our ability to critically select and reflect upon the tools and weapons (Deleuze & Guattari 1987, 403) we employ for this

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8 Description of the networked performance XNPM22, online last accessed January 21st 2023 <https://www.youtube.com/watch?v=fiCT-nLdXdU>.



purpose. We can perceive a threat in connectivity and recognize the network as a system of weaponry (Galloway & Thacker 2007, 16). Present-day political regimes are sustained through their relationship with networks, while “networked power is based on a dialectic between two opposing tendencies: one radically distributes control into autonomous locales; the other focuses control into rigidly defined hierarchies” (ibid., 19). Building upon Galloway and Thacker’s ideas, the notion of connectivity is so highly valued today that it is increasingly challenging to identify places or objects that do not, in some way, conform to a networking framework (ibid., 26). In summary, the “digital logic of combinatorial difference is now used as a tool of governance” (Culp 2022, 83), rendering connectivity a “techno-utopian business strategy that braids the physical with the virtual to create a sociopolitical empire of difference” (ibid.).

However, we must not overlook the cooperative intention evident in the aforementioned case studies. These projects clearly aimed to establish a connection between art and technology by following a shared trajectory of both the weapon and the tool, dispersing expertise and artistic inspiration on a global scale. This collective trajectory of the weapon and the tool brought together “subterranean, aerial, submarine technicians, who belong more or less to the world order, but who involuntarily invent and amass virtual charges of knowledge and action that are usable by others, minute but easily acquired for new assemblages” (Deleuze & Guattari 1987, 403). All three projects aspired to share technological knowledge, create a remote community of artists, and foster synergies. And that is not an insignificant or irrelevant endeavor. However, it is only meaningful when the objective is driven by existing subversive imperatives, evading centralized power structures and utilizing connectivity “to propose that an understanding of the control mechanisms within networks needs to be as polydimensional as networks are themselves” (Galloway & Thacker 2007, 63). It is undeniable that connectivity brings together ideas, thinkers, artists, and technicians from around the world, but it alone does not make a work radical. In other words, connectivity is not sufficient to reinforce subversive practices that could dismantle the existing political, social, urban, scientific, artistic, and ideological frameworks that all participating artists undoubtedly uphold in these case studies.

It is indeed useful to have new tools and possibilities available for artistic creation, but a critical stance is required. Mere experimentation is not good enough to cover today’s needs, when connectivity is used by everyone, be it nomadic self-managed and cooperative communities, or royal institutions, power assemblages and artistic empires. Art can no longer function as a playground of producing new sounds, movements, or colors. These experimentations could have been useful for the previous century, but the “honeymoon” with technology is over. We know how art and technology can both be used as weapons and as tools

by power assemblages, we know what's at stake, and wondering whether it can be used in an "art pour l'art" or "technology for technology's sake" cannot be valid today in contemporary aesthetics. Though technological media have infinite possibility, the objective remains to create collaborative spaces, non-hierarchical and anorganic. The challenge is not a mere democratization of the media, it is instead an attempt to reclaim the means of production, a social advancement from mere cogs of crowdsourcing ubiquitous lifelogging systems to active agents of co-creation in our own terms. And to do so, connectivity as a condition is not enough.

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### **THE POLITICS OF CONNECTIVITY: BETWEEN CELEBRATORY AND CRITICAL APPROACHES (summary)**

This paper delves into the role of connectivity in networked artworks and performances, adopting a critical approach towards its implications. The discussion revolves around three main case studies: the Xenakis Networked Performance Marathon 2022 online project, the 2023 Eleusis Mystery 91\_Magnetic Dance in Elefsina European Capital of Culture, and the Spaces of Reflection offline PirateBox network in the 10th Berlin Biennale. Drawing on theoretical frameworks such as Deleuze and Guattari's aesthetic theories and contemporary reflections on networks, the paper explores the omnipotence of connectivity in today's society. It also examines the influence of institutions, funding operators, and corporations on artistic connectivity, focusing on their agency and intentions.

Connectivity, facilitated by technological advancements, is often regarded as the cornerstone of contemporary artistic production. It encompasses various aspects such as the Internet, fast communication, data exchange, social networks, interactive media, and interactivity in general. Today, we have unprecedented opportunities to connect and collaborate online, regardless of geographical boundaries or time zones. The allure of simultaneous creation and the participatory nature of global connectivity have given rise to online communities and a sense of a global artistic village.

However, the landscape of connectivity has become increasingly complex as connectivity has evolved from a means of connection and communication to a tool of surveillance, biopolitics, and profiling. The paper aims to critically examine three cases of artistic connectivity while acknowledging celebratory aspects. The author's participation in these projects as both a creator and organizer fuels the critical perspective. By engaging in self-criticism and scrutinizing their own positionality, the author hopes to enhance their relationship with technological art and generate a more profound understanding of the consequences of artistic creation.

The potential of connectivity in contemporary society is not inherently revolutionary, as it has been extensively employed by capitalist systems and prevailing economic policies. While widespread connectivity offers technical capabilities, it also contributes to pervasive surveillance, constant lifelogging, anxiety, and global digital governance. Connectivity has been incorporated into the strategies of power structures, transform-

ing it into a means of control. To counterbalance these dynamics, critical selection and reflection on the tools and weapons employed become crucial.

It is essential to acknowledge the cooperative intentions embedded in the examined case studies. But, while this endeavor holds significance, it only becomes meaningful when driven by subversive imperatives, evading centralized power structures. Connectivity alone does not guarantee radicality; it requires subversive practices that challenge existing political, social, urban, scientific, artistic, and ideological frameworks upheld by participating artists in the case studies. This paper provides a critical exploration of connectivity in networked artworks and performances. It highlights the complexities and implications associated with connectivity, emphasizing the need for self-criticism, awareness of positionality, and an understanding of the consequences of artistic result. While connectivity offers immense possibilities for collaboration and knowledge exchange, its transformative potential can only be fully realized when employed as a subversive force against dominant power structures.

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## **FLOU: A CO-COMPOSITIONAL ATTEMPT AT ALGORITHMIC EMBODIMENT**

**Abstract:** My composition, *Flou* for solo violin, is an attempt at co-composition between the composer and the performer at embodying otherwise unidiomatic machine-learning generated materials. The piece touches on a broader compositional problem where historically, when algorithms were used as a means in itself, composers were often faced with tensions between the algorithm, the composer, and the performer. To contextualize further, Cage, Xenakis, and Boulez each came up with their own algorithmic processes and dealt with these tensions differently. Upon scrutinizing these composers' methods, I observe that these tensions are usually resolved by enabling agency for either side of the humans involved. As in, Boulez deviates from his algorithm to follow his compositional instincts, Cage creates indeterminate scores for performers to interpret, and Xenakis adds 'human touches' to his 'incomplete' algorithm. Considering these kinds of tensions, *Flou* uses an open score with only algorithmic pitch notated, which I ask to be played using an octave-lower scordatura. The open score affords the performer's freedom to react to the instability of the scordatura in non-pitch ways, and it is this tantalizing physical attempt at trying to play the algorithmic pitch that foregrounds the performer's bodily presence in the performance.

**Keywords:** algorithmic music, musical embodiment, phenomenology, acoustic composition, contemporary music.

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## ***Flou*: A Co-Compositional Attempt at Algorithmic Embodiment**

This paper discusses exclusively algorithmic music within the western contemporary classical tradition that is written for acoustic instruments. In order to articulate the research question more clearly, it would be useful to begin by addressing what I mean by algorithmic music, and from there, set up the scope of my research. Borrowing from Karlheinz Essl's definition, the term 'algorithm' in itself means a "predetermined set of instructions for solving a specific problem in a limited number of steps" (Essl 2007, 109). This definition breaks down the conception of an algorithm into three necessary components: 1) a specific problem to be solved; 2) a predetermined set of instructions to follow, and; 3) a finite number of possible outcomes as a result. Following this definition, Schoenberg's serialism, which admittedly uses a formalized procedure, is not technically algorithmic. To be sure, there are fixed sets of instructions in how dodecaphonic materials i.e., the tone row and its transformations are created. There are a finite number of ways in which the 12 notes can be arranged ( $12! = 479,001,600$  possible combinations) and there are limited steps in how each row can be transformed. However, although the series serves as a basic organizing principle for pitch and structure, Schoenberg is very much in intuitive control of how notes are used, while still following the predetermined order. For example, his *Variations for Orchestra* (1926–28) uses pitch quite strictly in the order of his tone row and its retrograde, inversion, and retrograde inversion. But here, Schoenberg has expressive freedom to manipulate parameters around pitch material in terms of orchestral timbre, rhythm, and texture, all of which goes hand-in-hand to create musical expression from dodecaphonic materials (Schoenberg 1950, 118–31). While the serial material in itself is algorithmically generated (in the sense that there are fixed definitions of what a tone row is and that there are limited ways of arranging one), Schoenberg's intuitive command in how he crafts music out of tone rows separates his music from the type of algorithmic music described in Essl's definition. With that said, in a roundabout manner, Schoenberg is still considered a putative pioneer of contemporary algorithmic music in the way his music led to divided reactions among the next generation of composers, namely Boulez, Cage, and Xenakis, all of whom opined differently about serialism and arrived at all sorts of algorithmic experiments for their own reasons. This paper will briefly survey the above composers' reasons for engaging in algorithmic composition in the context of the serial dispute and shed light on the underlying tensions in how they used their algorithms. Specifically, the emphasis will be placed on what they initially hoped to use algorithms for, and how/why they resorted to deviate from them. This will be followed by a final section to explain how these tensions and their deviations inform my recent composition, titled *Flou*.

### **Pierre Boulez: from *Structure Ia* to *Le Marteau sans Maître***

In ‘Schoenberg is Dead’, Boulez openly criticized Schoenberg’s serialism for its lack of critical awareness in its aesthetical implications. He wrote: “Under Schoenberg’s pen, in fact, there abounded – not without producing irritation – the clichés of redoubtably stereotyped writing representing, there too, the most ostentatious and obsolete romanticism” (Boulez 1968, 273). To be sure, at the time of writing, Boulez was not against the idea of dodecaphony in itself. It was specifically Schoenberg’s connection with the ‘old ways’ to use dodecaphony expressively that Boulez was against. For Boulez, serialism paved way for a path that helped him escape pre-established forms and styles from the historical tradition.

Furthermore, though Schoenberg’s serial technique was never intended to be used as an automatic system, Boulez found Schoenberg’s abstracted treatment of pitch to be lacking and wished for it to generate music more comprehensively (Boulez 1968, 275). As a result, Boulez began exploring serial technique that is integrally expanded onto other parameters, such as duration, dynamics, and timbre, along with pitch (ibid, 212). For example, in *Structure Ia* (1951), Boulez wanted to “find out how far automatism in musical relationships would go” and hoped that it would be able “to bring everything into question again”, to “make a clean sweep of one’s heritage” (Boulez 1976, 56–57). *Structure Ia* is a highly automatic algorithmic piece which Ligeti described as a “textbook example” of multiple serialism in his analysis of the piece (Ligeti 1961, 36).

Curiously, Boulez’s enthusiasm in totally automatic systems only lasted briefly, and never quite became Boulez’s main working method moving forward (Idon 2013, 119). Shortly after completing the entire set of *Structures I*, Boulez started adopting a more relaxed, compositionally intuitive approach towards algorithmic material. For example, in *Le Marteau sans Maître* (1955), rather than continuing to follow strict, automated serialization of material like in *Structure Ia*, Boulez embraces a more flexible and relaxed use of serial structures and returns to a more expressive language (Jameux 1991, 78). To be sure, Boulez’s revisit to expression in serialism is still considerably different from Schoenberg’s expressive approach. In fact, in *Le Marteau*, the creation of the work is not any less serial than *Structure Ia*. On writing *Le Marteau*, Boulez said:

There is in fact a very clear and very strict element of control, but starting from this strict control and the work’s overall discipline there is also room for what I call local indiscipline: at the overall level there is discipline and control, at the local level there is an element of indiscipline – a freedom to choose, to decide, and to reject (Boulez 1976, 66).

What Boulez means by “local indiscipline” is that he reserves his rights to make free choices to manipulate the serial organization expressively. In *Le Marteau*, for instance, the predetermined structure alternates between movements that are strictly serial structures and movements with greater compositional freedom (Koblyakov 1993, 1–3). Movements that are meant to be strictly serial use predetermined materials rigidly in a similar fashion as *Structure Ia*. This is contrasted by movements that are permitted by the higher order row to be free, where serial structures are interpreted intuitively and stretched expressively by Boulez. Boulez’s apparent relaxation from automatism seems to be driven by a desire to intervene with the system. As he explained:

I have the sort of temperament that tries to invent rules so as to have the pleasure of destroying them later: it is the dialectical evolution between freedom of invention and the need for discipline in invention... The difficulty is to find a point of balance, or at least a constant interchange, between these extremes (Boulez 1976, 64).

When Boulez speaks of finding this balance between “freedom of invention” and “disciple in invention”, he seems to be implying that there is a certain tension between “what the algorithm wants to write”, and “what his intuition wants to write”. This conflict is resolved, in *Le Marteau*, by giving himself the compositional agency to ‘destroy’ the system by deviating significantly from the original outcome.

### **John Cage: *Music of Changes to Concert for Piano and Orchestra***

After being acquainted with Boulez in 1949, Cage and Boulez stayed friends and continued to exchange ideas on each other’s music (Nattiez 1993, 4–17). Coincidentally, around the same time Boulez finished working on *Structure Ia*, Cage also completed his first algorithmic composition, the *Music of Changes* (1951). Cage described the piece as “an object more inhuman than human, since chance operations brought it into being” (Cage 1961, 36). By that, he meant that *Music of Changes* uses almost exclusively chance operations such that the “[composers] are removed from the activities of sounds they make”. (ibid, 10). In some ways, Cage’s attitude is not too dissimilar from Boulez’s multiple serialism. Boulez’s view, as outlined above, pushed for serial automatism as a means to break away from historical tradition. Here, Cage resorted to algorithms to “let sounds be themselves” rather than “vehicles for man-made theories or expressions of human sentiment” (ibid, 10). This is to say that both composers hoped for a radically new approach for composition that is unconcerned with the musical language of the past, and is removed from personal expression. However, in spite of the friendship between the composers, Boulez criticized such alea-



toric approach (without mentioning any names, but presumably towards Cage). Boulez wrote: “the individual does not feel responsible for his work, but merely throws himself by unadmitted weakness” (Boulez 1964, 42). Mutually, Cage disagreed with Boulez’s experiments in multiple serialism and found that they somewhat “diminish the interest they enjoy”. As Cage wrote: “curiously enough, the twelve-tone system has no zero in it...there is not enough of nothing in it” (Cage 1961, 53–79).

By and large, Cage’s algorithm, or what he called “composing means”, are elaborate and autonomous, perhaps more so than *Structure Ia*. In *Music of Changes*, Cage uses a series of coin flips to make decisions within predetermined charts of various musical parameters. Each chart is magic-square-like with materials filled in 8x8 grids, where eight charts are used to determine sound and silences, another eight are used for durations, eight for dynamics, and single charts for tempi and polyphony (Bernstein 2002, 262–63). Each square on the charts corresponds to the 64 hexagrams of the *I Ching*, where each hexagram is made of different combinations of solid and dotted lines. To select a square, Cage uses three coin tosses to determine the corresponding type of lines: two heads and a tail is a solid line, two tails and a head is a broken line, three tails is a solid line moving to a broken line, and three heads is a broken line moving to a solid line.

*Music of Changes* was by far Cage’s largest and most complex chance-based deterministic work written using precise notation. Curiously, after *Music of Changes*, Cage started experimenting with more open notation, such as in *Concert for Piano and Orchestra* (1957–58). The piece can be played in any order and by any combination of instrumentation ranging from solo to chamber to an orchestra. As analyzed by Iddon and Thomas, the parts have been intricately generated from a fixed set of predesigned instructions based on paper imperfections and *I Ching* castings, but details such as durations, dynamics, pitch, and many more are left unspecified to open up performative freedom for performers (Iddon and Thomas 2020, 1–3).

Notably, Cage’s use of open form and graphic notation enables performers to deviate from the algorithm quite freely under Cage’s, nonetheless, quite confusing performance instructions. In performing the solo piano version of the piece, David Tudor created his own playing score to use in every performance from the second performance onwards (Iddon 2013, 64–82). In this case, Tudor found a balance between the tensions of “what he wants to play”, “what Cage wants to write”, and “what the algorithm wants to write”.

There is an interesting parallel with Boulez in Cage’s discontinued interest in automatism where they both wrote a maximally deterministic piece and then retrenched from it in their own ways. Boulez gave himself greater compositional freedom, and Cage gave his performers greater interpretive freedom. It is also worth noting that Boulez had similar experimentation in open form, albeit in a

much more limited way, in his Third Piano Sonata (1955–57). Similar observations can be made where the openness of the work’s structure has given the performer some influence within the tension between “what the composer wants to write”, “what the algorithm wants to write”, and “what the performer wants to play”. To be sure, Boulez’s Third Piano Sonata is by no means as open as Cage’s, and functions more similarly to multiple ways within the same labyrinth.

### **Iannis Xenakis: *Achorripsis* to *Duel***

Like Boulez and Cage, Xenakis found his own musical ideas to be in opposition with the general impression of how serial music seemed to be developing in the 1950s. For Xenakis, the problem with serialism was that when one listens for polyphony in serial music of the likes of Boulez and Stockhausen, rather than hearing individual threads, one hears “a mass of notes in various registers...[and] there is consequently a contradiction between the polyphonic linear system and the heard result, which is surface or mass” (Xenakis 1992, 8). Xenakis’s criticism was that serial structures have gotten so perceptually dense that listeners can no longer hear the method in the music. However, unlike Boulez and Cage, Xenakis was unconvinced of using open forms to give the performer freedom over how the piece is performed. Xenakis found open scores to be problematic because they lead to a “substitution of authors”, where he sees it as a “resignation” of responsibility by the composer (ibid, 38).

With his disinterest in the aleatoric methods of Boulez and Cage, Xenakis nonetheless resorted to using chance-based algorithms to create deterministic works, but in a way that is distinct from Cage’s system of coin tosses. In *Formalized Music*, Xenakis describes his concept of “real chance” as a particular “rare thing”, which can only be understood properly through probability theory (ibid, 39). Rather than Cagean chance-based results, Xenakis tried to deal with “chance” itself. For example, *Achorripsis* (1957) applies the Poisson distribution function from probability theory to generate parameters such as speed, density, intervals, durations, and general structure (Gibson 2011, 71).

Contrary to what his advocacy of formalized composition might imply, Xenakis tended to interpret the theories behind his process more loosely than is usually assumed. As Xenakis clarified: “the theory and the calculation define the tendencies of the sonic entity, but they do not constitute a slavery” (Xenakis 1992, 34). In practice, Xenakis sets up his algorithms in a way that leaves certain, admittedly smaller-scale decisions open for himself subjectively. In some ways, this is similar to Boulez’s compositional freedom in *Le Marteau*, but here, Xenakis does not necessarily ‘deviate’ from his algorithm. Rather, he left ‘blanks’ in his algorithm for himself to fill intuitively. Where these decisions are made,

Xenakis prioritized faithfulness to the “spirit of the algorithm”, meaning his intervention functions akin to “human touches” to the algorithm. In other words, the tension between “what the algorithm wants to write” and “what Xenakis wants to write” does not exist, but it is at the expense of automatism. Given the deterministic nature of how the rest of the work is generated, Xenakis compromised the comprehensiveness of the system in exchange for the affordance to avoid tension between himself and his algorithm.

Interestingly, Benoît Gibson noted a connection between *Achorripsis* and *Duel* (1958) (Gibson 2011, 14). Perhaps as a reflection on his embark on the evidently more deterministic approach in *Achorripsis*, Xenakis asked:

Now the question is, when heard a number of times, will this music keep its surprise effect? Will it not chance into a set of foreseeable phenomena through the existence of memory, despite the fact that the law of frequencies has been derived from the laws of chance? (Xenakis 1992, 37)

In retrospect, the conception of *Duel* seems to be in contradiction with Xenakis’s initial skepticism towards open works. Gibson noted that *Duel* was written to prevent the foreseeable effect of stochastic music that is written deterministically like *Achorripsis*. In brief, *Duel* functions like a musical game where each orchestra has its own conductor, and they can choose to play from any of the six musical ‘tactics’ predefined by Xenakis. The succession of any two sonic events will produce a score of gain or loss such that eventually, one of the conductors will win (Gibson 2011, 15).

Notably, Gibson found that tactic IV in *Duel*, described as “stochastic percussion sounds”, is a direct quotation from the percussion section in *Achorripsis*. This suggests that despite using the adjective of “stochastic”, Xenakis did not make any new calculations and directly borrowed from his previous piece. In the context of my discussion of algorithmic music, *Duel* is considered algorithmic because there is a finite number of possible combinations between the tactics, notwithstanding the fact that the actual sonic material has been precomposed elsewhere and not strictly systematically. This categorization is made more confusing if it is taken into account that conductors can start and finish any time on the score, as long as each tactic is played for at least 10 seconds. Nonetheless, *Duel* is an interesting case where Xenakis laid down a set of instructions on “how to play the game”, and each performance will be different depending on the choice from both conductors.

Tempting as it may be to draw a similar observation as Boulez and Cage, Xenakis’s shift from using predetermined form to open form (which is to say, from *Achorripsis* to *Duel*) was only a brief experiment. Xenakis’s other works from *Achorripsis* onwards, perhaps with the exception of *Stratégie* (1962) and *Linia*

*Agon* (1972), continued to develop this approach to compose with a mathematical basis placed at the forefront of his compositions. For example, his ST algorithm continues to use the stochastic methods from *Achorripsis* for computer composition, *Herma* is based on the Boolean formula in stochastics, *Akrata* is based on sieve theory, and *Analogique* on Markov Chains.

Strikingly, all composers mentioned above have, in one way or another, wrote deterministic work as a reaction against general conceptions of serialism (*Structure Ia*, *Music of Changes*, and *Achorripsis*), and then eventually attempted more intuitive, open-formed, and/or indeterminate works (*Le Marteau*, *Concert*, and *Duel* – but except that Xenakis returned to follow his algorithms quite strictly). My discussion thus far has examined three typical ways composers have worked with (or deviated from) their algorithms. Boulez's *Le Marteau* is just as serially conceived as *Structure Ia*, but Boulez granted himself the freedom to deviate expressively from the generated outcome. Cage's *Concert* also uses strictly predetermined materials, but once the score and instructions are set up, it is up to the performer to interpret the piece freely. Xenakis's *Achorripsis* is ostensibly just as deterministic as *Structures Ia* and *Music of Changes*, all of which were written with the aim to remain 'faithful' to the algorithm, but *Achorripsis* is necessarily not as automatic because smaller-scale decisions are left for Xenakis to fill in.

In the context of the works discussed, there seems to be a conspicuous undertone here that suggests a triangulated tension exist between the composer, the algorithm, and the performer. As seen in the examples, these tensions are generally resolved by enabling agency between the humans involved. The composer's agency gives the composer a chance to 'add human touches' to the algorithmic outcome, while the performer's agency gives the performer an opportunity to engage intuitively with the material. These types of agencies can be of varying extents and used in different ways, as in Boulez grants himself more compositional agency than Xenakis does, where Cage arranges his material to facilitate the performer's agency. If neither the composer nor the performer is given agency, the algorithm will dictate the compositional material. When that happens, the piece will become dangerously close to Adorno's critique for systematic means of music generation, where "apparent objectivity of an overriding devotion to technique is nothing but an atrophied and impaired form of subjectivity" (Williams 2008, 194). It is beyond the scope of this paper to assess the context and the surrounding controversies in Adorno's *The Aging of the New Music*, but for the time being, the composition in question, as explained below, is quite far from the kind of music Adorno was (at least initially) against. See Martin Iddon's *New Music in Darmstadt*, page 110–16 for a more comprehensive overview of what Adorno meant.

## ***Flou* (2022)**

Having surveyed the historical approaches in algorithmic composition by contemporary composers for acoustic instruments, my recent co-composition, titled *Flou* for solo violin, considers the creative tensions explained above and attempts to explore a middle ground where the composer and the performer are both given agency to add ‘human touches’ to embody otherwise unidiomatic materials.

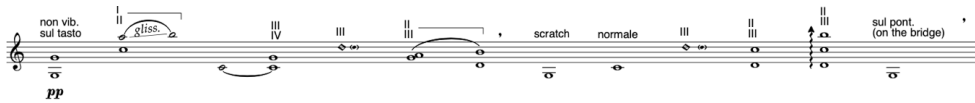
The algorithm uses machine learning to output pitch material in the style of my previous compositions. Since the algorithm does not provide any non-pitch parameter, the material is too ‘basic’ to function as a finished piece in itself. Furthermore, as shown below, the pitch material consists of dyads occasionally, which are not always playable depending on the acoustic instrument. Figure 1 provides a glimpse into what the machine learning generated material look like.



**Figure 1.** Machine Learning Generated Outcome.

In order to turn the material into a finished piece that remains faithful to the algorithm, I decided to give both myself and my performer different agencies to embody the piece. My main concern was that I wanted to use my compositional freedom to open up the algorithmic material in a way such that the violinist, Mira Benjamin, can have interpretive freedom that foregrounds her bodily presence in the performance. I also imagined that it would be alarmingly quite ‘dry’ to have the solo violin play the algorithmic pitch as it is, so I experimented with an octave-lower scordatura to obscure pitch material (hence the title). The octave-lower scordatura results in extremely loose and ‘flabby’ strings on the violin, and this physical phenomenon led to a series of secondary decisions to follow.

For example, due to the looseness of strings, it became physically more challenging to play double stops with the inner two strings without touching the outer strings. This led me to change the voicing, or in some cases the harmony of the dyads, to a perceptually similar sounding alternative that is more playable. Also, I noticed that the timbre and pitch of the violin becomes drastically more unstable in the scordatura. This led me to explore the inclusion of extended bowing techniques to introduce more unpredictability and timbral indeterminacy that come from the materiality of the unstable instrument itself. An excerpt of the final score is shown below.



**Figure 2.** Excerpt from *Flou*.

The result is that Mira is expected to struggle producing any of the notated pitch generated by the algorithm. Rather, it is the tantalizing physical attempt of her trying, despite the unstable scordatura, that gives ‘life’ to the algorithmic material. By removing bar lines and tempo, the rhythm has been freed up to give her the limited space to react and explore the sonic possibilities in the scordatura. Crucially, as we were recording the piece, we noted that it was important to ensure that the performer still had some control over the instrument to enable her to react ‘intuitively’ and ‘musically’ to whatever happens during the piece. This is to say that defamiliarizing the instrument can be a useful way of introducing the kind of unpredictability I am after, but there is a specific balance that should be achieved: too much familiarity may undermine the unpredictability that I desire, but too little familiarity may take away the ‘musical’ control that is crucial in the performer’s embodied experience of performing the algorithmic material. A full recording of the piece can be heard here: <https://soundcloud.com/kenrick-ho/flou>.

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**FLOU: A CO-COMPOSITIONAL ATTEMPT AT ALGORITHMIC EMBODIMENT**  
**(summary)**

This paper is a practice-led investigation on the limited human agencies in algorithmic compositional methods. My piece for solo violin, titled *Flou* (2022), was written in response to a general observation where historically, autonomous usages of algorithms tend to incur a disembodied quality to the music. Through discussing the broader context of contemporary algorithmic repertoire, I explain my approach in algorithmic embodiment where I aim to foreground the performer's bodily presence in her attempt at realizing the algorithmic material to her best ability. I begin by establishing a definition of algorithmic music. Schoenberg's use of dodecaphony, despite being a formalized method for material generation, is not algorithmic because Schoenberg's rows are used expressively and do not strive toward automaticism. Boulez's *Structure Ia*, in contrast, is serial and algorithmic because there are meticulous layers that help Boulez serialize structures without requiring much additional intervention. Cage's *Music of Changes* is also algorithmic because the method in itself is predetermined and automatic. The piece basically 'writes itself' once the system was predesigned and Cage is not required to intervene with the process. Xenakis's *Achorripsis*, is also algorithmic in the way its macro forms are predetermined by a mathematical equation of probability, but his algorithm is not wholly automatic and leaves out the lower-level decisions for himself to 'fill in'. After a brief discussion of the pieces above, this paper observes a curious trend where these composers have coincidentally attempted to write strictly notated, deterministic algorithmic music as a reaction to serialism, and have, in their own ways, eventually experimented with more open-formed, indeterminate scores after. For instance, Boulez grants himself more compositional freedom in *Le Marteau* than in *Structure Ia* to enable a more expressive language to use serial materials. Cage grants his performers interpretive freedom by using graphic notation in *Concert for Piano and Orchestra*, and Xenakis had several open form experimentations such as *Duel*, based on game theory. In contemporary acoustic algorithmic music, I argue that when an autonomous algorithm is rigidly followed in the compositional process, the music becomes more interesting when the humans can afford agencies to facilitate a resolution of the creative tensions between the algorithm and the composer and performers. Having identified these creative tensions and how they are resolved differently by these composers, *Flou* is a co-creation between the composer and the violinist, where the algorithmic outcome is followed rather strictly, but the composer and performer both add 'human touches' by notating/performing a semi-open score. These collaborative interventions and unpredictabilities are welcome, insofar as they are imposed without undermining the 'original spirit of the algorithm.'

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## **RESHAPING THE MUSICAL EXPERIENCE: A CRITICAL EXAMINATION OF *MUSIQUE CONCRÈTE* AND THE NOTION OF 'MUSIC OF TECHNOLOGY'**

**Abstract:** The critical examination in this paper should point to a shift in a perspective in understanding *musique concrète* (concrete music) in relation to its historical evaluation, viewing it as a *music of technology*. The paper is based on the hypothesis that each technology in its materiality and functionality shapes the outcomes that arise from it, which is ultimately aimed at looking for the 'human' in the 'composer-technology' dichotomy. That is where the reshaping of the musical experience takes place. But it should be noted that the technology share will be questioned through only a few aspects of concrete music, which is why there is an open possibility for further research problems.

**Keywords:** *musique concrète*, technology, music of technology, electro-acoustic music, Pierre Schaeffer, musical experience.

*(...) the exploitation of technology is often disguised by claims of authenticity and naturalism – camouflage designed to preserve and protect the myth of artistic inspiration.*  
- Peter Shapiro, *Modulations*, 2000.

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## Introduction

By way of a few introductory words, it may be appropriate to refer to Jonathan Kramer's reflection on the impact of technology on musical experience in a general sense of meaning:

(...) our conservatories and universities must train their music students to understand and respect technology, not to fear it. A young violinist may still spend countless hours alone in a practice room, improving his/her sound. But how often will that sound be heard without the intervention of recording, broadcasting, or acoustic-reinforcement technology? That violinist need not become a technological expert, but at least must learn what technology is capable of doing and how to communicate with engineers. Any musician who does not know the meaning of words like equalization, digital editing, sampling, reverberation, mixing, etc., is out of touch with his/her art and is, in a real sense, illiterate (Kramer, n.d.).

The research question from which the critical examination of *musique concrète* begins in this essay is essentially related to the intention and effort of framing a specific musicological point of view on electroacoustic music. The very style of writing indicates that the author does not try to offer any kind of answers in this paper, but rather to come up with as many questions and problems as possible that require more detailed and systematic research, and would help to explain in depth the subject of electroacoustics research, that is, *musique concrète* as an instance of type. In other words, this piecemeal research endeavor is not an "attempt to encapsulate the 'state of knowledge' of a subject field at a particular time" (Emmerson 2018, 10). Consequently, the text is woven from a series of apparent digressions that divert scientific writing into deeper-rooted problems of *musique concrète*. However, the following research issues are not self-contained nor mutually exclusive from one another; rather, those issues persistently assert themselves and prompt a critical examination of the assumptions.

The effort to introduce the term *music of technology* was motivated by the insufficient representation and reverence given to *musique concrète* in the sphere of the "official" knowledge about music in the 20<sup>th</sup> century.<sup>2</sup> The author assumes that this probably arose from the lack of an adequate perspective in the research of music that originates from the 'inside' of technology,<sup>3</sup> or there is an additional

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2 This is an obvious omission from the position of authority of the Western institution of art music, especially musicology, despite the importance and impact of *musique concrète* in the 'broadened' field of music.

3 In this paper, the term "technology" primarily pertains to electroacoustic technology as *metaapparatus of communication*, with occasional references to computer technology. Certain

problem that arises in efforts to formalize *musique concrète*, since formal coherence<sup>4</sup> is a very important characteristic of musical composition in a traditional sense.<sup>5</sup> He also believes that it is necessary to offer a specific perspective – a technological one – through which we would actually observe its essence, starting points, intentions, and goals, as well as composing process, analysis, the way of (re)shaping the musical experience, finding a humanizing element in what arises ‘from’ technology, etc. There is an attempt to say that this is in some way a need for a (historical) re-evaluation of *musique concrète*.

Stepping into the knowledge and findings from the history of 20<sup>th</sup>-century music means stepping into a handful of paradigmatic streams and boundaries of consciousness, each of which has its own value in the artistic sense. Some of these paradigms have been accepted *cum laude* by the ‘official’ music history, but some have passed under the radar of the academic milieu, despite their importance and impact.<sup>6</sup> One such phenomenon is *musique concrète* or concrete music (both terms used interchangeably throughout the text), most likely ‘disenfranchised’ due to apparent naivety, undeveloped semantic system, and non-musicality in the conventional sense attributed to it. An average connoisseur of concrete music will most certainly recognize the superficiality and layman’s interpretation here. Be that as it may, concrete music appears in various encyclopedias, catalogs, books, and indeed a few academic papers,<sup>7</sup> where it often receives piety and recognition for its pioneering merits in electroacoustics,

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concepts mentioned in the paper can be explicitly understood within the context of 20<sup>th</sup>-century technologies that played a significant role in the emergence and evolution of *musique concrète* (for further details, refer to Schaeffer 2017). Due to methodological considerations, the author chooses not to provide an exact definition of the specific types of technology (even in the operational sense, be it memory, reproduction, analysis, or any other), as doing so would necessitate a separate discussion. Alternatively, the title itself would serve to guide the research in that particular direction.

4 “(...) [formal] coherence manifests itself as a limitation in the choice of compositional materials and a consistency in the operations applied to those materials. (...) music is not a purely formal system; rather, it is grounded in acoustics, auditory perception, and psychology. Musical coherence seems to be a poorly understood psychological category. (...) [An algorithmic] approach [to music] make for a tidy package, free from anomalies and logical inconsistencies. The compositions it produces can be proven to be formally consistent, even if they are dull or incomprehensible” (Roads 2015, 21; cf. *Ibid.*, 64–5).

5 In this sentence, among others, there is a justification for the research of this kind. Could it be that *musique concrète* lost its historical ‘battle’ in academic circles based on a forced attempt to formalize it as such?

6 A similar observation can be found in Valiquet 2018, 98.

7 As excellent examples of valuable academic understanding of concrete music, the author of this article recommends other authors’ writings on this topic, namely Brian Kane, Michel Chion, Carlos Palombini, Leigh Landy, and Curtis Roads, as well as the authors that can be found in the list of references at the end of the article.

although the explanations and discussions are very modest.<sup>8</sup> Therefore, the critical point of view taken in this paper will serve in part as an attempt to correct this omission of music history, at least to a lesser extent.

### **How and why does concrete music begin from the ‘inside’ of technology?**

Although technology by itself is perceived as socially neutral, the appearance of each of its subsequent types increasingly determines all kinds of our life actions and ways of living. According to Social Construction of Technology (SCOT) foundations, technology represents some kind of working framework or “frame with respect to technology” (Klein et al. 2002, 31, as cited in Bijker 1995, 126) and implicitly determines limits and possibilities, both in work and in life,<sup>9</sup> which is directly reflected in the reshaping of different cultural matrices and ways of behaving.

The narrative of technology as a kind of ideological force within the field of electroacoustics, and causally *musique concrète*, should begin with the assumption that a technological artwork<sup>10</sup> – visual as well as auditory – can legitimately exist. Such thinking is motivated by the thought that the history of music over the past hundred years and so is mainly the history of technology (Shapiro 2000, 2; Rebelo et al. 2018, 139). In support of that, we could note that technology was and still is a fundament for most of the paradigms in music.<sup>11</sup> The 20<sup>th</sup>-century artistic music will serve as good proof for that claim. Various aesthetic goals of contemporary music, i.e., electroacoustic and electronic music composition as an artistic activity in a large number of cases appeared, progressed, and died out with the appearance of each new technology (Valiquet 2018, 98); most of the old, entrenched paradigms were replaced by new ones, and the science behind each subsequent technology ensured the survival of those paradigms that were potentially good enough for further artistic (or technological?) research and refinement.

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8 For an introduction to the topic, see Schaeffer 1986. For more precise insights and discussion, see Battier 2007.

9 In this kind of question, it is useful to consider the variegated views in the dichotomy of technological determinism and the social construction of technology, set forth in Yousefikhah 2017, 32–34.

10 In this context, the term “technological artwork” refers to a work that exists as an instance of a type in digital art, but also in general to a work inspired by the drive of technology. For a more detailed insight, see Cecchetto 2008.

11 For a more comprehensive examination of the historical portrayal of the evolution of technology and art, refer to Mikić 2004, 39–63. Also see Holmes 2008; Katz 2004; cf. Cunningham et al. 2017.

So, how is it possible that *musique concrète* as an artistic practice rests on technology? This problem is addressed by David Cecchetto's statement (which will serve as a basis for further considerations here), although directed towards the explanation of a technological artwork:

The technological artwork can be understood as particularly powerful in this respect, then, because a computer [as well as other types of technology] des not [sic!] carry the enormously (and complexly) rooted history that, for example, a violin does. In the absence of this history and its rituals, then, the mode of presentation enacted by this work is emphasized because it is chosen rather than assumed. As such, these choices are made both in terms of content and of context, leaving the technological artwork (perhaps) uniquely positioned to enact the political reality of it's choosing (Cecchetto 2008, 17).

The critical use of technology can be an excellent starting point for research of any kind. This is because, for example, electronic components or computers do not include any kind of prejudice or conventional systems of values and belief (cultural, emotional, aesthetic, political, religious, moral, etc.). As Ian Andrews states, "an investigative starting point free of such prejudices is said to be *pre-suppositionless*" (Andrews 2013, 69). In other words, again and again, we choose the position from which we observe technology,<sup>12</sup> which clearly alludes to the phenomenological character and such research methodology.

Aside from the common knowledge of the well-worn story about the benefits of using technology (see Rebelo et al. 2018, 140), its technical aspects and the benefits of using it, the epithet of powerful tools and the possibility of ease at work, speaking from a scientific-and-artistic research position – the one that seeks a 'perfect' unprejudiced zero point for research – we will potentially be able to understand why concrete music starts *from the depths* of technology.<sup>13,14</sup> This is quite obvious since concrete music appeared in the mid-20<sup>th</sup> century, i.e.,

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12 In addition, it would be helpful to know that "if we cannot analytically distinguish between context and content (technology), then it is impossible, even in a tentative way, to understand how the social world shapes (the meaning of) artifacts" (Klein et al. 2002, 36).

13 In this regard, we should consider this view: "The first act of 'relaying' by the concrete musician is related to the machine. It suggests, by virtue of its arrangement and its functions, possibilities of actions related to a given real-world sound, such as is its recording. (...) It is here that we interpose the idea of reinvention: throughout the twentieth century the artist has shown how he can transform the machine into a basis for creation. When the gramophone changed its status from being an apparatus for reproduction to an instrument of production, an artist has, by thought or deed, reinvented the apparatus" (Battier 2007, 195).

14 The integration of technology into the process of observations is paramount for the study of concrete music (as well as *elektronische Musik* and computer music). As Chagas discusses, "(...) [in the observing process] technology itself becomes an observer. The observer 'is characterized by being able to make descriptions'" (Chagas 2014, 134, as cited in Foerster 2003, 283).

in the midst of the expansion of analog technology for recording and manipulating audio signals. To cut a long story short, without technology as a research and operating platform, concrete music cannot exist<sup>15</sup> (the statement includes electroacoustics and electronic music in a broader sense as well).

### **Semantic and aesthetic aspects of using technology in concrete music**

In concrete music, there is not a single sound event or a sound object that exists by 'itself', i.e., nothing happens without symbolic thinking. Every element in a concrete piece should be there for a reason. This is also the case with various instances of *call-it-so* abstract contemporary music, e.g., (post)spectralism, (post)serialism, (post)minimalism, new complexity, etc. However, each of the aforementioned practices is set up at some level of compositional calculation or determination which is superior to a material for the purpose of planning and building the process of encrypting musical thought, that is, for the establishment of some kind of form.

The aggravating circumstance for this type of musical thought characteristic of concrete music is not so much contained in symbolic thinking itself, but rather it is actually the problem of applying symbolic thinking in the phase of analysis (just listening or subsequent theoretical conclusions) which, according to high-brow artistic customs, should respect the existence and legitimacy of a musical work that has no conventional type of score. Difficulties in the analytical approach to electroacoustic music arise due to the untranslatability of meanings, processes, and strategies into another context (Caesar 1992, 32), which is very often scaled with culturally accepted meanings.

Despite sporadic instances of divided academic opinion on the increasingly complicated issue of (limited) usage of technology in music,<sup>16</sup> as well as the conventional perspective that *tool*, also known as *technology*, should not have a significant function in musical composition, and that 'what a composer brings to a tool' is important,<sup>17</sup> electroacoustic music actually indicates that technology leaves a noticeable mark on artistic strategies. But what is really causing the problem here? Conventional opinion most likely originates from attempts to

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15 For a more detailed insight, see Schaeffer 2017, 69, 321–339.

16 It could be assumed that this is a historical problem that probably originates from the 1950s, i.e., from the aesthetic 'gap' between the *elektronische Musik* and *musique concrète* (Chagas 2014, 108-9; cf. Rebelo et al. 2018, 139–40).

17 "(...) the history of artificial music is more deeply rooted in composer's opinion and aesthetic ideals than in technological data – even in the field of electronic music (...)" (Danuser 1984).

‘translate’ and (re)contextualize the system of relations and meanings of electroacoustics (see next section) to the principles of acoustic music. Such endeavors are simply pointless since the history of music, as well as aesthetics, lead to the thinking perspective that these two ‘poles’ of music have very little in common. To an average, but also classically trained listener, intentions of acoustic music are much clearer than intentions of electroacoustics; we receive and understand instrumental sound sources in combination with technical aspects of a particular work as data or information, since the instrumentation is very limited in relation to the totality of all possible existing sounds, and, on the other hand, different composing techniques and strategies have been codified within the centuries-old tradition of classical abstract music.<sup>18</sup>

In contrast to acoustic music, the compositional strategy of ‘listening’ with acousmatic intention (see Chagas 2014, 128; cf. Schaeffer 2017, 69) – which is imposed by the nature of concrete music – fundamentally deals with the problem of recontextualizing the sound object in the musical sense (Bayle 1997, 17). A trained listener will potentially be clear about a sound source, although one will not expect it in a given listening context. Defining a meaning of a compositional process for a listener is presented as an intimate process, since a listener himself is expected to reconstruct any explanation for the ‘sequences’ of sound/musical objects he listens to in real-time, even immediately afterward. The very idea of the possibility of composing electroacoustic music as such already transcends conventional musical ideas. A very idea and an extensive set of possible composing actions in electroacoustics dismiss the view of music as an architectural entity with different measurable quanta in traditional parameters.<sup>19</sup> In fact, a certain idea in concrete music is based on the principle of organic development and the continuous flow of sound material in time. Therefore, “it is a discourse at the level of perception, not a concept” (Brümmer et al. 2001, 8) in which we find ourselves in the acousmatic problem of continuous ‘rationing’ acoustic/musical elements, attempts to distinguish sound sources, interpretations of mimesis, references, meaning, and semantic allusion (Roads 2015, 85, as cited in Barret 1997 and Bodin 2004). So, a listener has a very specific task: to clarify and explain to himself what he hears and what it means for him; there is no unified system of meaning, at least not yet.<sup>20</sup>

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18 About the ‘fashion’ of individual and historical styles, this story deserves a different form of discussion, but that kind of detailing is not necessarily needed here.

19 “In traditional Western music, the note is like a brick – a basic building block of musical structure” (Roads 2015, 72).

20 The author finds a motive for such a point of view in the typological and morphological systematization, that is, the classification of sound objects, which he found in the writings of Pierre Schaeffer (see Schaeffer 2017, Books Five and Six).

Although it seems that electroacoustics, especially *musique concrète*, lacks inventiveness,<sup>21</sup> it is essentially no less inventive than instrumental music composed *in a score*. A concrete piece finds impetus in a composer's skills and experience with studio equipment and certain suggestive characteristics of 'raw' sound as a material.<sup>22</sup> A layered process of composing results in an electroacoustic piece that could offer a listener a more precise compositional intention, especially if one takes into account the advantage of direct intervention on a musical 'text', as well as feedback received through multiple listens to a piece during a composing process.<sup>23</sup> From the technical aspect, the above should convey to us the extent to which (equally or even more) a concrete music composer is involved in the *symbolic explanation* of work in the same way as a composer of any other musical genre, whether it is historical or not.

The fact is that concrete music and electroacoustics in general leave a listener indifferent if he tries to translate the experience into one of the other musical languages, systems, or aesthetics. This is because technology-born music requires its own 'grammatical' determinants – syntax, vocabulary content, methods, and outcomes that match its materiality and functionality. Consequently, in concrete music there is no systematic, unified, or prescribed approach for the analysis of such works;<sup>24</sup> each work is *new*, it is a language for itself and contains universal characteristics and parameters, so the analytical approach should be entirely

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21 Interpreting this statement from a historical perspective, very likely one of the interpretations would be that this was usually the case in certain academic 'turmoils', often originated by composers or advocates of various genre trends in electroacoustic music of the 20<sup>th</sup> century. Among others, those are examples like Jean-Claude Risset's criticism of concrete music as compared to early computer music (Chagas 2014, 133-4, as cited in Risset 1990, 108), the allegation by Pierre Boulez about condemning concrete music and acousmaticians to failure due to his own unsuccessful 'concrete' etudes (Roads 2015, 71; Ross 2007, 279-80), or Boulez's determination to prevent (by what means?) the use of personal computer technologies for generative purposes in compositional processes (Taruskin 2010, 495, as cited in Jameux 1984, 18-20). The latter is quite a paradoxical point of view, especially bearing in mind the 'technological legacy' of IRCAM, whose founder was Boulez himself.

22 "Schaeffer also meant the term 'concrete' to refer to a studio-oriented manner of composition based on interaction with specific tools. (...) Since concrete sound depends on recording [that is – technology!], it follows that the audio quality depends greatly on the resolution of the recording chain (microphones, preamplifiers, and the recording medium). Equally important is the technique of the sound engineer" (Roads 2015, 80).

23 This indicates that the *trial-and-error* method is one of the main methodologies in composing *musique concrète*.

24 For example, François Delalande addressed these questions relating to listener responses and differentiated them as "taxonomic (distinction of key morphological units to acquire a synoptic sense of the work), empathic (attention to individually felt sensations and experience of sound dynamic), and figurativist (interpretation of the sound work as a narrative) and/or as mixes of these elements." Sally Jane Norman adds the ability of human organs to be answerable to unruly amalgams of habits, expectations, and aspirations (Norman 2018, 210).



analogous to that. Analytical procedures still do not represent a tool with which one could approach the systematization of electroacoustics in the narrower and broader sense; even the very description of the work depends on its character and fails to 'extract' and apply earlier levels of knowledge.

In general, what holds value for individuals is often deeply interconnected with meaning. But our understanding of 'meanings' is not just a projection of our values. This can be explained using the example of a sound object in concrete music. The 'feeling' evoked in a person who listens actually already exists as part of a sound object, thanks to its shape, i.e., its morphology (Bayle 1997, 17). It is about taking a purely phenomenological perspective in practice. On the other hand, the 'attractiveness' of the visual in relation to the auditory is psychologically imposed as dominant; certain visual cues are archetypes naturally appealing to our eye. Although in the sense of sound as a unique, (un)repeatable energy and time-space event, the *contour* of a sound is in a psychological sense (sometimes also psychoacoustically) positioned as a 'support' for meaning, which will ultimately determine its potential function.<sup>25</sup> Concrete music, among other things, deals with the research of morphological characteristics of sound in the context of musical composition, and with the assistance of computers, the research process is somewhat easier; according to a more precise visual representation of audio signals through various software tools, we will be able to explain things more easily and more precisely. Perhaps it would be wise to perceive concrete music in a general semantic sense as a chain process of *research – modification – composition – (auditory) re-research* applied to the morphology of sound events or objects that have a specific aesthetic purpose.

Works of concrete music, just like those organized according to the aesthetics of relative silence, are particularly operative in such a way that they leave enough interpretive sonic space in which a listener, as a listening *self*, can confront himself as a listener (Philips 2006, 233). With this, we step on a path of a humanizing element in the *music of technology* (see next section). The search for each unique subjectivity of listeners and composers is consciously encouraged. With that in mind, can we perceive music as a language? Probably not. Music, both in the most conventional and the most modern sense, is essentially a *game of relations* (see Minsky et al. 1992 32–33) in which everything depends on a chronology of cause and effect(s). Thereby, it is not possible to establish or systematize the objective spectrum of meaning of musical elements nor parameters, and then the possibility of defining an 'agreed' system of meaning in the communication chain between a composer, a listener-individual, and concrete works certainly suffers.

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25 The stated point of view can only be considered through the use of technology for recording, reproduction, and analysis of audio signals, since in *laboratory* conditions sound as such becomes the object of study.

A perfect fourth interval, a dissonant orchestral chord, pizzicato passages, or a piano pedal tone, just like a raw or modified sound object in electroacoustics, simply do not have the potential to ‘say’ something accurately (see Huron 2006), concretely, and objectively comprehensible in the chain of communication. This is their artistic significance and usability at the level of materials. In contrast, language operates with signs and meaning in all its aspects. Also, it is extremely functional in terms of realizing meaning in communication; there is a basis, an ‘agreed’ spectrum of meaning that facilitates the understanding of each piece of information. Practically speaking, if communication is successful and a message is received, a language will be a semantically functional system. In most cases, various aspects of a concrete or abstract piece of music fail to reach this.

According to the pioneering concrete works, as well as post-Schaefferian trends in electroacoustics, we see that composers of concrete music are/were fully aware of this endlessly entangled semantic problem, just like the fact that communication cannot be one-sided. However, we will notice another solution; the only functional solution at the semantic level is brought into the process of evolution from the *art of composing music* to the inspiring *art of listening to sounds* initiated from a composer-insider to a listener-outsider. In conclusion, we pretend to say that in concrete works it is absolutely impossible that the levels of understanding of a ‘message’ are not uncertain.

### **Why *Music of Technology* and does technology even matter?**

The origin of the term *music of technology* follows the path of defining the object of music as “music that exists because of the use of electronics rather than music that simply uses electronics” (Valiquet 2018, 98, as cited in Holmes 2008). In order to avoid doubts about why the author takes a one-sided attitude towards *musique concrète*, omitting or not specifying other (sub)genres of electroacoustics, it is necessary to emphasize that the principles explained in this paper are very applicable to the entire field of electroacoustics as such.

The term *music of technology* does not solely encompass “music made with technology” (see Emmerson 2018, 10), as it extends beyond the production aspect. By refining the definition, we could include that the genuine essence of thought in *musique concrète* (and hence electroacoustic music) becomes discernible through technology. It is worth noting that there are several key areas where technology proves to be valuable as “access points” (as issued in the following sections); it is crucial to recognize that the compositional process is not the sole aspect to consider.

*Musique concrète* starts from what a sound itself has to ‘say’ (see Chagas 2014, 122–3), which becomes an associative instruction for research. That means that

the ‘concrete’ method is empirical; in a processual sense, the empiricism starts from *found sounds* and “moves toward a musical macrostructure using available tools” (Roads 2015, 80). A detailed insight into the properties of a sound (object) can only be obtained with the technology, and for the kind of research required by concrete music, we really need an in-depth, *probe-like* approach to sound properties at the micro level.<sup>26</sup> Only electroacoustic technologies, as well as computer ones, will enable us to do this, and there is no different way.<sup>27</sup> In relation to the variety of compositional material (more or less everything musical or non-musical we hear in our surroundings), a composer of concrete music *discovered* something that we could presumably find or hear elsewhere – but in a much ‘rawer’ and ‘rougher’ form, i.e., in the form of a sound object as it *is*<sup>28</sup> – and then using adequate technological procedures recontextualized it from its ‘natural habitat’ into a musical object that becomes an integral part of a musical work.<sup>29</sup>

In an effort to begin from a zero point of research which, as stated, should be presuppositionless, concrete music places all its objective power and potential usability on machines. Since it was driven by the power of technology, we can discuss some kind of *symbiotic* relationship between music and machines. A process of planning, recording, listening, inspecting sonological properties, multidimensional analytical examination of the suggestiveness of sound as material and its characteristics, and on the other hand manipulation, modulation, mixing, and organizing processes, all the way to reproduction and spatialization – everything is being supported by technology in one form or another.<sup>30</sup> Causally, the question arises, what is happening at the edges of technology, i.e., in

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26 Concrete music, as described by Curtis Roads, is distinguished by its emphasis on “hyperrealism and magnification” of sounds, which is often perceived as a process of “sound zooming”. Roads defines *hyperreal magnification* as “the exaggeration of feeble sounds for expressive effect. This is analogous to the blowup technique in photography, which greatly magnifies a detail of an image” (Roads 2015, 86).

27 A related issue from an ontological perspective of ‘authentic sound’ is addressed in Bohlman 2000, 32.

28 Many useful insights on this subject, as well as insights into the philosophical and aesthetic foundation that underlies acousmatic music, can be derived from Kane 2014 (cf. Roads 2015, 85).

29 This can be observed in an early example of concrete music in Pierre Henry’s *Variations pour une porte et un soupir* (1963).

30 The fact that each of the mentioned composition–engineering steps (and there are many more!) in working with sound has become a separate field of study with a distinct stage of scientific and practical discipline speaks volumes about the potential of using concrete music as an artistic practice in the sphere of applied music and industry.

the instance that exceeds the boundaries of user experience?<sup>31,32</sup> The answer to that apparently simple question is what concrete music deals with, among other things.

In the realm of aesthetics of *musique concrète* (see previous section), the research of different sound properties by various techniques of isolating sounds is just one of many aspects and broader solutions. By developing notions such as sound objects or sound events as analytical and synthetic categories resulting from the interaction between sound material and technical apparatuses (Chagas 2014, 107), *music of technology* presents a comprehensive approach that allows for diverse possibilities in sound exploration, manipulation, analysis, listening, musicalizing (very often something non-musical, such as different types of noise), composing music, (re)contextualization of sound objects/events and (re)shaping the musical experience<sup>33</sup> for the purpose of establishing meaning(s) for each listener, and the like.

In light of the previous discussion, defining concrete (electroacoustic) music as *music of technology* at its core would signify that it emerges from the utilization of machines (see *ibid*, 124). The significance of technological mediation cannot be overstated, as it plays a crucial role in shaping an environment where specific tools give rise to a wide range of possibilities and foster exploration that goes beyond traditional boundaries. The pros and cons of technology depend strictly on the user's intention, experience, and way of dealing with it. However, in the domain of electroacoustic music, technology is just as important as the artistic or research thread of music itself.

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31 For more on user experience, tacit knowledge, and participatory design, see Tanaka et al. 2018, 173.

32 At the time of writing, the author does not know the precise definition of “edges of technology” from a scientific point of view. One possible interpretation could be that “edges of technology” are everything that in one way or another exceed the stated norms, and by its nature (mostly intimate and very difficult to explain) belongs to tacit knowledge in electroacoustics. Also, one should bear in mind that the “edges of technologies” could be examined from semantic complexities intertwined with technological advancements. In the interpretation of “edges of technology”, one should pay attention to “(...) three domains of technological frames: 1) Nature of technology, that implies on the image of technology and its capabilities and functions in the minds of users, 2) Technology strategy, that is the motivation or vision behind implementation of that technology, 3) Technology in use, that refers to understanding of how to use the technology on day to day basis” (Yousefikhah 2017, 37, as cited in Bartis 2007, 129).

33 Various terms, such as acousmatics, different types of listening modes (see Schaeffer 2017) or ways of dealing with mimesis (could be connected with expanded sonic imagination), reproduction technology, immersive and spatial experience (multidimensional sonic environments), etc., are included here.

## Is there a 'humanizing element' when working with technology?

Electronic machines and computer science guarantee hitherto unimaginable power, precision, and opportunities. But all sensory relationship between man and instrument has disappeared. From musical conception to musical production there is now nothing but causal relationships, which we must *understand* to control. (...) the workings of a machine are always comprehensible. Is this true of the workings of music? (Schaeffer 2017, 546).

If we operate with digital or digitized data, the computer will serve us as a tool for editing data and adding effects that are in no way possible with analog technology.<sup>34,35</sup> But the fact that both analog and digital technology are not linear means that material can be edited or reproduced from any point in (virtual) time-space, regardless of the beginning or end of the *tape*. In other words, the phenomenon of non-linearity is the most important humanizing factor. However, it should be noted that the sequential mode of operation of digital technology is essentially linear in most cases during the execution process, while the 'humanizing' element in the sense of non-linearity belongs to the user's work process.

Facing the reality of technology is the fact that, at least for now, it is constantly evolving. Accordingly, composers and scholars should be aware of the limitations and possibilities of the technology<sup>36</sup> they work with or own. Within the operating technological 'corpuses' or their own framework, user-composers give meaning to the product that they are using (Yousefikhah 2017, 36).<sup>37</sup> Awareness of these issues and problems will define the specifics of music composed with a specific technology, so each "piece of equipment" will leave a unique mark on the piece of music. We cannot really talk about this if we question classical

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34 For more precise information about the principles and techniques of composing music with an analog tape, see Russell-Hallowell 2019. The same principles and techniques are very easy to achieve using digital technology.

35 The sudden transition of the author's thoughts to digital technology should not be seen as an intention to specify or determine technology but as an attempt to explain the studied (musical) phenomena that originate from the 'inside' of technology. Based on this, the author tries to set as many questions or problems as possible for more focused research. The story of the type of technology being studied, just like what was gained/lost by the transition from analog to digital or something else, deserves a different kind of discussion.

36 François Bayle shares a similar sentiment: "We should not be afraid of imperfect technology. It is often the confrontation with limitations and "faults" that stimulate one in making a piece. I am not alone in this view" (Bayle 1997, 18).

37 This can be observed and determined on various domains and meanings, considering elements such as "goals, key problems, problem-solving strategies, theories in hand, tacit knowledge, design methods, etc." (Yousefikhah 2017, 36, as cited in Bijker 1995).

(or abstract) acoustic music. The aesthetic vision derives directly from practice, leaving idealistic philosophy aside. A true understanding of the technology used will enable the composer to assess the ‘correct’ evolutionary steps in the processes of electroacoustic music. Theodor Adorno also warned about the problem of senseless, i.e., uncritical use of technology in modes in which it becomes objectively powerful. The question of its (un)usefulness in art is still a burning question today, primarily because of its distribution in all aspects of life. However, the mannerisms of a machine devoid of any kind of utility only emphasize its uselessness in the midst of universal utility (Adorno 1988, 109). In other words, from the unconscious and biased interpretation of the role of machines in the composition of contemporary artistic music, composers will get a ‘useless’ result, precisely the kind for which numerous later artistic discourses attributed the blame to romanticism, and triumphed on the basis of that. A special aesthetic task when composing in most cases is the “humanization of a piece of music”, that is, the task of a composer of electroacoustic music is to control the machine to the level of achieving the highest *human* result. In the golden age of analog and early digital machines, Daphne Oram (1925) had these perspectives:

By ‘human’ in this context I do not mean that the sound must ape a human voice, or ape an instrument played by a human being. I mean that there are certain human qualities which are difficult to convey by electronic machines. Machines, at their present stage of evolution, do not appear to be designed for conveying this humanizing element. It is this humanizing element which (...) enables individuality to become apparent and express itself (...) (Oram 1972, 93).

Applied to the modern world, looking at digital machines as tools that need to be (pre)programmed over and over again in order to get a result, it is noticeable that even modern machines lack a humanizing element.<sup>38</sup> At this point, one should slow down and change the way of seeing things, while taking into account the historical immediacy of Oram’s words. However, there is another side of the story – the digital natives’ one.<sup>39</sup> Observing the current situation through the prism of democratization,<sup>40</sup> and consequently individualization in accessing technology, artistic and research thinking supported by in-depth knowledge of hardware and software can bypass this situation and *shift* the humanizing element to the foreground through unconventional and *not-quite-machine* proce-

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38 A related issue is addressed in Chagas 2014, 110–11, focusing on the relationship between creativity and technology as an important research field of electroacoustic music. Also see Emmerson 2018, 9.

39 A well-described and vivid example of how digital natives relate to technology can be found in Milojković 2020, 284–334.

40 For a more detailed examination of technological changes, progress, democratization, innovation, and adding political values to technology, see Valiquet 2018, 108.

dures and operations. Nothing can be perfect; it is a human artifact (see Norman 2018, 210, as cited in Vaccari and Barnet 2009, 10) because it is in man's nature to be imperfect. In this way, we will be drawn into the discussion about whether man can really progress with technology and, if so, whether progress is guaranteed. But nothing is black or white; it is all about layers and nuances.<sup>41,42</sup> In relation to the pioneers of electroacoustic music from the 1940s and 1950s, and the knowledge, very limited recording and studio equipment, and *primitive* skills they had at their disposal at the time, we could probably determine that contemporary composers already by default possess a certain set of advanced or expert skills that enable the use of technology that exceeds the boundaries of user experience. Most of them are already digital natives according to their own environment in which they develop and operate. Therefore, for successful realization of an artistic vision, machines must be explicitly viewed as a very limited synthesis of means, media, and tools. Otherwise, the means, tools, and medium will be the ones dictating the way of composing. By avoiding unenviable situations, the composer shows his individuality. The process of composing becomes challenging due to the fact that each machine, piece of equipment, hardware, or software requires a new research approach with the aim of finding enough space to identify the humanizing element in a technological artwork. Ultimately, the question arises: what can we do with a certain technology? A professional composer who programs a machine knows exactly what result he can expect based on the input; therefore, he can use technology to express his idea as clearly as possible, which further depends on one's character and intention.

This is where the digression should begin. It is necessary to refer to some kind of non-linearity of sound objects, on the basis of which the technological *design* of concrete music will be explained, and at the same time to see how all the above works in practice. Namely, the non-linearity of objects as compositional material and *fragments of perception* does not refer to the position of an object and its 'accessibility' in technological time-space, but to the change in

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41 The modest history and index of composers of concrete music actually prove that man can progress if *fused* with technology – progress as a unique 'symbiotic organism'. This does not necessarily imply transhumanist ideals, but rather refers to a natural progression of a man-technologist-composer. However, accepting the imperfections and surprisingly narrow frameworks of machines is the right path to a piece of concrete music. In that sense, François Bayle expresses thoughts of exceptional importance for the scientific interpretation of the *music of technology*. Quote: "Most composers of *musique concrète* are stimulated by what happens at the frayed edges of the technology. This is important. If we adopted a Boulezian attitude, we would say that defects are inadmissible. Upon their discovery, we would call the management and throw out the technician. If your attitude toward defects is punitive, then you cannot continue" (Bayle 1997, 18).

42 "Technology not only allows and encourages extension – it becomes a manifestation of that extension" (Emmerson 2018, 11). This statement by Simon Emmerson – although from a different perspective – supports Bayle's view quoted in footnote 21.

psychological perception of sound in the context of a complete piece of music with each new listening. Relying on his theory about sound and musical objects, natural/innate perception of sound qualities, and 'learned' cultural criteria for the process of listening to music, Pierre Schaeffer (1942–1990), after many years of interdisciplinary research,<sup>43</sup> considered:

Another misunderstanding would be to expect typology [of sound objects] to provide fool-proof boxes in which sounds could be classified once and for all. It must be stated emphatically that a sound-object may very well jump from one box to another according to the degree of attention with which we listen to it, and the degree of complexity conferred upon it by its context. This remark will avoid many useless discussions and time-wasting (Caesar 1992, 12–13 after Schaeffer 1967, Face VI, section 88).

On the other hand, the manipulation of sound objects will often give a non-linear result that needs to be contextualized within the musical composition. With digital technology in his work environment, the composer is able to multiply processes that take place simultaneously, that is, to layer effects or sound events. In software, this most often looks like a series of vertical layers applied to a horizontal structure of sound events. The multiplication of simultaneous processes within one sound object will ultimately give a unique sound event. Expressed in the language of mathematics and its derivatives, non-linearity is defined by the fact that the change in the output is not proportional to the changes in the input, but is directed towards the aesthetic goal and raising the usability potential of a sound object as a *fragment of perception* in an artistic sense.

The digression ends. Based on the above, we see that the logic of music composition based on recorded material leads a composer to the inevitable situation of 'outsmarting the machine' because the technology by itself does not exist as a 'generator' of (musical) language. At whatever stage of development it is – now critically speaking – a machine should always be perceived as an assistant, not a leader. A composer's role is to manage the process, and that can often be very demanding since compositional processes (as well as composing processes) in electroacoustics often require an interdisciplinary approach<sup>44</sup> due to their complexity, whether the outcome is tape or live music interpretation.

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43 The outcomes of Schaeffer's research can be found in his Treatise, see Schaeffer 2017 for more.

44 The term 'interdisciplinary' means that a composer will very often simultaneously use skills and knowledge from completely separate disciplines, such as music composition (often as a primary discipline), music production and industry, sound design, computing and programming (not necessarily music only), sonology and (psycho)acoustics, audio engineering, physics, knowledge of video technologies and the like, but also disciplines that do not necessarily have limitations in professional qualifications (e.g., DIY and similar 'adaptive' concepts).



The following statement by Pierre Schaeffer points to the ‘composer-technology’ dichotomy: “Electroacoustic systems are powerful, but they are not musical instruments; they are sound machines. And before putting questions to the computer, we must know what we ourselves think” (Schaeffer 2017, 555). We will take the first quoted sentence with a certain historical distance and worldview since the expansion of PCs as very powerful technologies in line with postmodernist ideas will only begin about 30 years later. But this is the point; prejudices that identify studio equipment with an instrumental corps can become an enormous obstacle for music composition. In this sense, a composer’s most common problems are technological ignorance and failure to recognize the non-linear response of technology. And why would that even be a problem, at least in a practical sense? Well, in this case, a composer relies on the ‘machine as an instrument’ and misses out on what could be used as a tool for unique artwork. There is an example of this already in the pioneering days of electronic music in the narrow sense (so-called *Elektronische Musik*). Here, one appeals to one-sidedness in understanding music composition, melting from concept to concept on the basis of material and structure, and ignoring the basic principles that technology ‘imposed’ on music as art – invention, and discovery.<sup>45</sup> Ultimately, the intention to act between invention and discovery – both in the technical and musical sense – is essentially a consequence of critical understanding that a composer’s work in the domain of electroacoustics can only develop as long as the keyword ‘experiment’ is focused, and with the aim of finding what is primordially human, not technological. The condition for invention is the art of finding the ‘new’, and in the context of electroacoustic music, this depends entirely on the composer’s ability to use technology as a means, tool, or medium to cohere invention and discovery with changing concepts such as material and structure.

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45 In particular, the aesthetics of Karlheinz Stockhausen and the team gathered under the WDR Electronic studio label is questioned here. The reason why Stockhausen took serialist principles and *mapped* them to electronic ‘experiments’ (in the partial sense of the word) is potentially debatable. Just listen to what happens in his *Studies* (1953 and 1954) – is that music really *electronic* or can we still discuss the *acousticity* of that music on the basis of the compositional strategies and processes taken over from serialist legacies? And why is it even important? Perhaps it can be a problem that remained unsolved at the very beginning, so it is often considered that electronic music is going through a crisis even today – this could also be discussed. It’s a matter of genesis.

## Concluding remarks

Considering the assumption that there exists a domain *beyond the sound*, which represents the fundamental investigative problem of *musique concrète*, any approach to that domain necessitates the intervention of technology. This recognition led to the coinage of the term *music of technology*, aligning with the underlying justification for *musique concrète* as an artistic practice that originates *from the depths* of technology. The notion of *music of technology* addresses more than just music produced with technology; it signifies a deeper connection between thought, sound, and technology, i.e., it broadens the scope of sound exploration and it could help provide meanings for individual listeners. Ultimately, the term reflects the inherent functionality and essence of concrete music, highlighting its symbiotic relationship with technology.

In conclusion, it is almost imperative to adopt a specific technological perspective in order to gain insights into the essence, origins, intentions, and objectives of concrete music. This perspective, among others, allows us to examine the composition process, analyze the (re)shaping of musical experiences, and identify the humanizing elements that emerge from the utilization of technology. By embracing this technological 'lens', there arises a need for a historical reassessment of *musique concrète* and electroacoustic music in general, which can provide a deeper understanding of its musicality, significance, and the profound impact which passed 'under the radar' of the authorities of art music. This reevaluation only superficially delves into the early stages of the notion of *music of technology* and provides a nuanced perspective on the artistic and cultural value of *musique concrète*.

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**RESHAPING THE MUSICAL EXPERIENCE:  
A CRITICAL EXAMINATION OF *MUSIQUE CONCRÈTE* AND THE NOTION  
OF ‘MUSIC OF TECHNOLOGY’  
(summary)**

This paper critically examines *musique concrète* and proposes the notion of *music of technology* as a means to address the existing limitations in understanding and representing *musique concrète* within the ‘official’ knowledge of music.

Concrete music, as well as electroacoustics and electronic music in a broader sense, places its objective power and potential usability on machines, leading to a symbiotic relationship between man and technology. Therefore, the author explores the compositional process, aesthetic and technological aspects of *musique concrète*, emphasizing the interplay between music and machines.

Concrete music explores what happens at the ‘edges’ of technology, delving into the semantic complexities intertwined with technological advancements. Composers of such music are aware of the intricate nature of communication and the inherent uncertainties in conveying a message. As technology continues to evolve, composers and scholars must be conscious of its limitations and possibilities. The specifics of music composed with a particular technology are defined by understanding and addressing these issues.

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# REVIEWS



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## **13TH INTERNATIONAL SYMPOSIUM “MUSIC IN SOCIETY”, Sarajevo, December 7–10, 2022.**

The Musicological Society of the Federation of Bosnia and Herzegovina celebrated its 25<sup>th</sup> jubilee in 2022. The fact that the Musicological Society is one of the fundamental and most relevant bearers in all fields of music science is confirmed by the continuity of its International Symposium “Music in Society”. The 13<sup>th</sup> edition of the Symposium was made in collaboration with the University of Sarajevo – Academy of Music and the Department of Arts, Artistic Research, Culture and Sports, Gazi Husrev-Bey’s Library, and the National Museum of Bosnia and Herzegovina. This was the first post-pandemic edition of the Symposium, and its program of a four-day event gathered 74 experts from 17 different countries in the fields of musicology, ethnomusicology, music theory, music pedagogy, and other related scientific and artistic disciplines. The program included 18 sessions, three workshops, two keynote lectures, a solemn session, an exhibition and a concert, in four different locations. It should also be noted that, for the first time, the Symposium was hybrid based – it had both live and online presentations.



**Figure 1.** Poster of the Symposium.

The first three days of the Symposium each began with one of three workshops under the common name "Music Research Begins with the Rs", all held at the Academy of Music. The first workshop featured "Répertoire International de Littérature Musicale (RILM). Global Music Resources for the Local Music Research", by Zdravko Blažeković. The next day, the second workshop was reserved for "The Musical Press and the Musicologist: Opportunities and Case Studies", presented by Benjamin Knysak. Daniela Castaldo talked about "Répertoire International d'Iconographie Musicale (RidIM)" in the last of the three workshops.

The Symposium was mainly focused on thematic sessions, which were all, in their own way, based on different aspects of music. So, the first session dealt with contemporary views on old music. The five lecturers, Daniela Castaldo, Michał S. Sołtysik, Rolf Norsen, Alessia Zangrando and Patrick Huang, all demonstrated a study on an old practice in music which extends from music archaeology in Italy, through Greek mythology to Balkan music and Chinese tradition. The session "Revisiting Historic Musical Works" consisted of three studies. The one presented by Srđan Atanasovski addressed a rivalry in music based on Schubert's compositional choices and the concept of the "Beethoven Project". Later, Jan Lech talked about a peculiar mentorship that follows the story of Shostakovich's Symphony No. 1, as told in his letters to Boleslav Yavorsky. The third article, lectured by Sanja Kiš Žuvela, deals with the antiwar music by Gustav Mahler. Later on, the first of two sessions exploring the region's historiographic perspectives on music was held. Some lectures in this session dealt with the work of Alfred Pordes (Maja Vasiljević, Fatima Hadžić). The last session of the Symposium's first day, interestingly named "Music(ology) in expansion", among other things, opened up questions concerning musicology as a modern science of music that follows technological progress trends.

Following an opening speech from Amila Ramović (the President of the Musicological Society of Federation of Bosnia and Herzegovina), Ališer Sijarić (the Dean of the Academy of Music), Tamara Karača Beljak (Vice-rector for Arts, Artistic Research, Culture and Sports at the University of Sarajevo) and Aleksandra Nikolić (the Minister of Science, Higher Education and Youth of the Sarajevo Canton) the 13<sup>th</sup> International Symposium "Music in Society" was officially inaugurated. Later on, the first Keynote Lecture was held. On this occasion, Zdravko Blažeković presented a brief history of the theater curtain and their decorations.

On the second day, four more sessions were held, as well as the second Keynote Lecture given by Amra Bosnić. In her lecture, Professor Bosnić talked about her research concerning the symphonism in Bosnia and Herzegovina between Socialist *Weltanschauung* and *Weltansicht*. As for the sessions, the first one of the day was based on ethnomusicological research. The presenters showed a spectrum of exciting research they made regarding vocal technique in *sevdah*



singing (Damir Imamović), as well as group singing with the accompaniment of *gusle* in Central-Eastern Bosnia (Zorana Guja Dražeta), all the way to the ones regarding a male singing octet from the tiny Serbian village Drmno (Maja Radivojević), and so on. The next session saw a continuation of the historiographic perspectives on music in the region. It was focused on some of the prominent names in the ballet history of Croatia, mainly Franjo Horvat (Tatjana Čunko), and also on the establishment and first years of the Music Institute in Križevci, Croatia (Lucija Konfic). The following session was about music pedagogy and reflections of the presenters on the challenges, advantages and weaknesses of teaching music theory classes or solfeggio classes online, along with the experiences and challenges in implementing the teaching methodology practicum for the future teachers of the musical-theoretical subject(s). One session that raised the most questions and was of significant interest to the gathered crowd was the one held by Amila Ramović, that looked back at the music in Sarajevo under the siege (1992–1995). On this occasion, the significant expansion of the alternative rock scene in besieged Sarajevo was recalled (Aida Adžović); so was the case with the results from analyzing the patriotic songs produced during the war in Bosnia and Herzegovina (Petra Hamer). The critical role of music (and culture altogether) in the war years and why it is important to gather all possible sources on music in besieged Sarajevo was also the topic in this session.



**Figure 2.** Amra Bosnić's keynote lecture. © Bakir Memišević.

At the end of day two of the Symposium, for the occasion of marking the 25<sup>th</sup> anniversary of the Musicological Society of the Federation of Bosnia and Herzegovina, the solemn, special session was held, where Mirza Dautbašić (Vice-Rector for Research of the University of Sarajevo), Tamara Karača Beljak (Founder of the Musicological Society), Amila Ramović, Ališer Sijarić, Senad Kazić (one of the Presidents and Founder of the Musicological Society), Fatima Hadžić (former President of the Musicological Society), Branka Vidović (Founder) and Maja Baralić-Materne (Founder) all talked about the beginnings, work, importance and influence of the Musicological Society.



**Figure 3.** Special session of the Musicological Society of the Federation of Bosnia and Herzegovina. © Bakir Memišević.

Sessions on the third day began with a discussion on popular music, where presenters talked about a variety of music phenomena, such as the American guitarist, singer, songwriter, and political activist Tom Morello (Samuel Murray) as well as the Dutch alternative rock band De Staat (Marcel Bouvrie) and ultimately the music used in the series *The Flash* (Marc Brooks). The next session was called "Artistic Research in Music". It was based on performative art music practices, including the amateur choir in an operatic dialogue and the study of wearable body instruments. Before resuming the sessions, the participants of the Symposium had a guided tour around the Nation Museum of Bosnia and

Herzegovina and a chance to see the exhibition "Sevdalinka – Picture, Word and Sound", all led by Nirha Efendić, the author of the exhibition and curator of oral poetry at the Ethnology Department of the National Museum where the next two sessions were held. The first demonstrated the contributions to the research of music at the intersection of the 19<sup>th</sup> and 20<sup>th</sup> centuries, where presenters talked about the works of people involved in making a difference in music history, one being Ilma de Murska as presented by Vjera Katalinić, another being Julius Fučik in the thesis of Darina Svobodova. Also, some of the most famous theater forms in the regions of Catalonia and Switzerland in that specific time frame were revisited. Damir Imamović, the moderator of the next session, opened up a topic named "Concepts of Otherness in Musical Practices", and in the following five lectures, the audience heard a lot of interesting facts about the music, language, generational shift, and assimilation in the Bosnian-American Diaspora (Tanya Merchant). Two topics addressed the Roma musicians and their music and culture. Two were concerned with the pioneers of African American musical theaters and the Chinese perspective on racism in music studies.

The end of the third day was reserved for the Concert of Traditional Music from Bosnia and Herzegovina performed by the Etnoakademik ensemble, which gathered three young sevdah musicians – Alma Subašić, Damir Galijašević and Zanin Berbić. On this occasion, the delighted audience could hear famous and lesser-known traditional sevdalinka songs accompanied by accordion and saz.

On the last day of the Symposium, the first session raised a question of current research in applied musicology in which a few topics were discussed. Music festivals and the process of making them, their problems and perspectives, along with ideas concerning contemporary strategies of music festivals, were just some of them (presented by Marija Maglov, Vanja Grbović, Bojana Radovanović and Teodora Trajković, Miloš Bralović, Miloš Marinković). Afterward, an exciting session was ongoing with talks on historical views of popular music in Yugoslavia, mainly based around the well-known music bands Bijelo Dugme and Indexi, in addition to research concerning one of the most famous jazz trumpeters Duško Gojković (Sead S. Fetahagić, Nikola Komatović, Ognjen Tvrtković). The next session was centered on studies in musical analysis. The presenters had a chance to show their reflections on the orchestral works of Jug Marković (Radoš Marković), elements of the harmonic language in the cycles of solo songs for voice and ensembles by composers from Bosnia and Herzegovina (Sabrina Đulančić-Fejzić), and to talk about the musical language of Gustav Mahler (Silvana Jakupović Bečei). It was time for the last session of the symposium. Domagoj Kučinić opened it with his views on the work of Croatian musicologist and composer Pavao Markovac. Later on, new music phenomena in the streaming era and the politics of music in the film *Battle of Sutjeska* were all questioned. In conclusion, in the closing session, Amila Ramović reminisced about the im-

portance of keeping the symposium going, thanked all the participants and organizers and stated the official end of the 13<sup>th</sup> International Symposium "Music in Society".

Now, when we look back, we can conclude that the Symposium was excellently conceived and executed. It offered thematic variety, showcased the depth of musical research, and created a spark that could inspire both musicians and scientists to begin new research, as well as a glimpse of what the science of music is all about to the general public. As it is a biennial symposium, for now, we can only anticipate the ones that will be organized in the coming years.

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**Rijad Kaniža** (b. 1997, Livno) is a musicologist and composer who focuses on electronic and electroacoustic music. His musicological research mainly delves into how human interaction with technology develops musical materials, particularly with regard to computers. Kaniža's compositions blend cultural models and musical idioms from pop culture with contemporary artistic music, examining their functionality in new musical and technological environments. Kaniža currently works as a teaching assistant at the Department of Musicology and Ethnomusicology at the University of Sarajevo's Academy of Music, as well as an administration member of the Institute of Contemporary Artistic Music (INSAM) and editorial team of *INSAM Journal of Contemporary Music, Art and Technology*.

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As a passionate nature enthusiast, Liebermann spends much of his time studying the sounds of wildlife. He is known for his original and accurate transcriptions of animal vocalizations, which have gone viral on social media and been featured in the world-renowned magazine National Geographic. These transcriptions have also earned him invitations to international congresses in Colombia and Brazil, as well as a feature on CBS Sunday Morning. Liebermann is the author of *Birdsong: A Musical Field Guide*, a book that offers a unique perspective on the musicality of birds and their relationship to human music-making.

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In the last few years she has participated in interdisciplinary research projects on contemporary music and its relation to other art genres, in various musical and geo-located projects, and has worked as a music teacher in education. She works with sound, music, walking, public space and performance and is a founding member of akoo.o group, with which she engages in the composition of soundwalks and audiowalks with the use of locative media.

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<https://tinyurl.com/yfvvpbn7>

<https://soundcloud.com/danapapachristou>





# GUIDELINES FOR AUTHORS



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Authors must submit original, unpublished articles.

All the manuscripts should be accompanied by author's name, affiliation, e-mail address, and a short biography (up to 150 words per author). Articles can be submitted in English (preferably) and Bosnian.

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Regarding the citations, authors should use the author-date system with the separate bibliography, following the guidelines given in Chicago Manual of Style (The Chicago Manual of Style, 17<sup>th</sup> ed. Chicago: University of Chicago Press, 2017; [http://www.chicagomanualofstyle.org/tools\\_citationguide.html](http://www.chicagomanualofstyle.org/tools_citationguide.html)). Please note that the list of references (bibliography) given at the end of the article must only include works that are cited in text.

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