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Collaborative Creation in Electroacoustic Music: Comparative Analysis of Three Case Studies

ABSTRACT

The revolution of sound recording, analogue synthesis and the birth of computer music, caused the emergence of a new professional profile, the Musical Assistant — someone who collaborates with composers in the phase of researching, writing, creating new sounds, recording and/or performing live during concerts — whose presence remains hidden most of the time. How can we find traces of this collaboration in analysing electroacoustic music? I propose a unified methodology at the intersection of Music Analysis based on electronic and computer sources and instruments; the ethnographic research, being collaboration based on oral traditions and activities; the philology of music and source criticism. The article focuses on three Musical Assistants: Marino Zuccheri (1950s), Alvis Vidolin (1980s), Carl Faia (2000s). The choice is motivated by the significance of their work with composers such as Luciano Berio and John Cage (Zuccheri), Luigi Nono and Salvatore Sciarrino (Vidolin), Philippe Leroux and Jonathan Harvey (Faia). The collaboration I discuss here does have many facets and is rarely the same from author to author, from project to project. There are however several aspects that emerge such as diachronic versus synchronic collaboration, the mode of thoughts emerging from material and oral sources, intentions, actions, and constraints, psychology and authorship.

1. INTRODUCTION

‘Music, broadly defined, is a collaborative art form. Perhaps, even, the ultimate collaborative art form. The interdependence of the various actors within the field is manifestly clear’ (Faia 2014, 15). This quotation introduces us to the theme of this paper: collaboration in electroacoustic music. However, unlike traditional acoustic music, where actors are composers, performers, and conductors, electroacoustic music is characterized by another agent, the Musical Assistant.

The revolution of sound recording, synthesis and transformation from the late 1940s, caused the natural emergence of this necessary but often concealed new professional profile. Its name has also been loosely applied or even changed along the years: musical assistant, technician, tutor, computer music designer, music mediator (Zattra 2013), Klangregisseur, live electronics musician, digital audio processing performer (Plessas and Boutard 2015).

The Musical Assistant is an ‘interface’ between composer and technology, creation and research. Musical Assistants are ‘the bridge between scientific aspects [...] and purely artistic aspects, they work in close contact with composers and/or artists’ (Orlarey 2015). They handle the technical setup of a music piece from the early experimentation phases until the concert production. They may explain to the composer/artist the latest outcomes in computer music technology or psychoacoustics, the musical potentialities of sound effects. They translate the composer’s artistic ideas into programming languages. They transpose those ideas into a score or a computer

program and often take part in the performance of the musical piece during the premiere as well as subsequent performances (Zattra and Donin 2016, 437).

Although it is common, in film music or in popular music, that composers write for example the theme and then the arranger, the orchestrator, the conductor, the musician, or the producer, works to bring music to its final form, this situation is slightly different in avant-garde music, especially in avant-garde music using technology. While music composition up to the first half of 20th century ‘has seen general estrangement between composers and performing musicians, specialist performers of New Music have stepped forward to bridge the gap’ (Gyger 2014, 33), as they actively seek to collaborate with composers on the creation of new works or the interpretation of existing works. This is the case, for example, of Luigi Nono with his musicians/collaborators/co-creators Roberto Fabbriciani, Ciro Scarponi, Giancarlo Schiaffini. Nonetheless, in spite of the evidence of this collaboration in a growing number of compositions, there still is, as noted by Musical Assistant Carl Faia:

the prevalent consensus in serious music circles that the composer should be the master of everything: not just the composition of the work, but also the orchestration and even the performance of the work as conductor or instrumentalist. (Faia 2014, 15.)

Analogue or digital instruments — according to the historical period of reference — may serve to develop compositional ideas and material; moreover, they are machines for exploring musical ideas, and instruments in the performance of a musical piece. Still, while traditional instrumental music has developed quite standardized systems for writing acoustic orchestral music, in the electronic world it is unrealistic to think this possible, and to imagine composers be perfect connoisseurs of those techniques. There are composers, although very few, being also performers, and professional electronic instrument experts. But this is the exception, because electroacoustic music requires highly specialised skills. In fact, few composers — at least until recently — are able to generate computer music pieces autonomously, from the first conception and synthesis, to the diffusion of sound.¹

Collaboration is common practice in music using technology. This paper has the purpose of revealing the agents of three examples of this network: Marino Zuccheri — whose activity concentrated during the 1950s and 1960s —, Alvis Vidolin — whose activity started at the end of the 1970s and still continues to this day —, and Carl Faia — whose activity began during the 1990s and still continues. The choice is motivated by

¹ In the past, we can cite John Chowning, Jean-Claude Risset and James Tenney, who were at the same time composers, researchers and computer programmers (Kahn 2012, 131–46).

the significance of their work with composers such as Luciano Berio and John Cage (Zuccheri), Luigi Nono and Salvatore Sciarrino (Vidolin), Philippe Leroux and Jonathan Harvey (Faia). It is the aim of this comparison, to trace analogies and differences, which are also motivated by historical and technological circumstances.

In examining this collaborative framework, I propose that collaboration in electroacoustic music prompts composers and musical assistants to: from one hand, for musical assistants, to imagine what composers have in mind when they communicate their musical vision-aesthetic, and/or their idea of timbres, interaction, musical form, etc.; to translate this into code, data, algorithms, etc.; to bring forwards scientific-technological results/systems/trends and suggest solutions, etc. From the other hand, for composers to understand the technological framework — possibilities and constraints — and decide whether to remain within those possibilities-constraints or to cross those limits, developing at the same time their mastery of the compositional disciplinary and aesthetic vision.

In order to study collaboration in electroacoustic music, I propose a unified methodology at the intersection of: 1) Music Analysis based on electronic and digital sources and instruments; 2) the ethnographic research, being collaboration based on oral traditions and activities; 3) philology of music and source criticism. I report findings based on archival research, published and unpublished sources — written, oral and video — and administrative documents, preserved at different archives: the archive of the Studio di Fonologia della RAI in Milan — now digitized and held at the NoMus Association in Milan —; Alvis Vidolin and Carl Faia private archives; IRCAM (Institut Recherche et Coordination Acoustique/Musique in Paris); and CSC-Centro di Sonologia Computazionale in Padua. Heterogeneous sources pertaining three Musical Assistants (Marino Zuccheri, Alvis Vidolin and Carl Faia) help reconstructing their approaches to collaboration (chapters 2–4). Their comparison (chapter 5) brings out new information on the way collaboration takes place in electroacoustic music.

2. MARINO ZUCCHERI

Marino Zuccheri (1923–2005) was the sound engineer, chief sound technician and Music Assistant/collaborator of the Milan RAI (Italian Broadcasting Company) Studio di Fonologia. He helped Luciano Berio, Bruno Maderna, Luigi Nono, Henri Pousseur, John Cage among others in giving birth to their musical works.

In 2008, Umberto Eco presented his insights as regards the role Zuccheri had in many of the musical pieces. Eco suggests that Zuccheri's contribution was so strong, that in some cases electronic pieces going under other names, were really his. As he recalled:

all the protagonists of *Neue Musik* used to pass by there and it is fair to recall that, since many of them were in Milan to study with scholarships and had to present a complete composition at the end of their term, and the period had not been long enough to master all nine oscillators secrets, great Marino Zuccheri would put together an acceptable composition with a couple of moves, thus many of electronic music incunabula are his and not by those authors who signed them. (Eco 2008, translated from Italian.)

Without questioning the place of the avant-garde music composer, it is however interesting to stress the importance of

the Musical Assistant, as it emerges from this quotation. Composers certainly came to the Studio di Fonologia with their vision, their musical world, and their aesthetical peculiarity, but without Zuccheri's dexterity, there would be no musical outcomes. 'Technicians from the first analogue era of electroacoustic music — therefore acousmatic —, like Marino Zuccheri at the Studio di Fonologia [...], can be seen more as cinematographers or directors of photography', said Musical Assistant Alvis Vidolin. 'These technicians had a crucial role to play, just as technicians did in the film production' (personal communication, 12 April 2013).

However, collaboration differs from case to case. As Maria Maddalena Novati puts it, 'composers such as Berio and Maderna were very determined, they knew what they wanted. Zuccheri did not influence them, he executed their wishes, sometimes not even that [because they were autonomous]' (Novati, personal communication, 10 January 2017).

When reflecting upon his own collaborations, Zuccheri recalls that:

Bruno [Maderna] was the most enthusiastic, perhaps also the most instinctive, nothing stopped him; he was more of an 'artist', he invented and... go ahead. Berio knew precisely where he was going, and he had a perfect knowledge of the machines. Gigi [Luigi Nono] was the most serious... Three different attitudes, three different artists, three people of great value. I must admit that I had a great time...and such jokes!'. (Zuccheri, in interview with De Benedictis 2000, 178.)

Zuccheri also stresses that they 'we got on very well in the respect of our different competences: the musicians 'ruled' the machines, and I made the machine work. It was great for me to work with such people: to be where you discussed art...'. (Zuccheri, in interview with De Benedictis 2000, 178).

3. ALVISE VIDOLIN

Alvis Vidolin (1949) is the co-founder, member and researcher of the Centro di Sonologia Computazionale (CSC – University of Padua). He is a sound engineer, a live electronics performer, and a researcher. He has worked with many composers including Giorgio Battistelli, Luciano Berio, Aldo Clementi, Franco Donatoni, Adriano Guarnieri, Luigi Nono and Salvatore Sciarrino. He has assisted them during the creative process, and has worked as a performer in the first and in subsequent performances of the compositions. He has consistently taken care to document and preserve information pertaining to his work, particularly with regard to the upgrading of technology.

Alvis Vidolin's modes of collaboration can be reconstructed mainly through several interviews I had with him from 1998 to 2016. According to his experience:

In my experience, a great work of oral communication and planning is the key to a successful collaboration. In my work, I feel I have two basic tasks: the first is to understand the composer's vision. This is possible only through dialogue, empathy and even imagination: as in any relationship, it is not always easy to decipher others' mind and intentions. Planning is the second important tool and the key to a positive experience. By planning, I mean taking the time to organize, reflect after meetings, submit my ideas, solutions, creations. After that, I leave composers the time to evaluate and discuss again and again every step of the creative process, in order to deliver on time something that really satisfies them, represents

them, but still is something I am happy about. (personal communication, 12 April 2013; also published in Zattra 2018, 87–88.)

Dialogue, empathy, planning, and time are keys to collaboration. This also applies to Vidolin's role of interpreter, because he is in a position to perform the musical work in the correct way, following the composer's intention.

Looking closely to Vidolin's collaboration with Luigi Nono, culminated in the creation of *Prometeo: Tragedia dell'ascolto* (1981–84), we understand that they met several times, both in Padua and Venice. Because Nono was not fully satisfied with MUSIC 5 program used at that time at CSC, he decided with Vidolin to design a real-time digital sound processor. The result was the 4i system (Zattra 2018, 89–90). They also met in Venice, where the composer lived, where they listened to typical Venice sounds. 'I kept a diary of those meetings. He made me listen to some sounds with glass bells' (Vidolin's personal communication, 1 June 2009, and Zattra 2018, 90). Vidolin's journal, kept during the creation of *Prometeo*, is rich in information. One of the first pages marks their first — or at least one of the very first — meeting. 'Prometeo, incontro con Gigi, Aprile 1984. [Meeting with Gigi (a nickname, short for Luigi)], April 1984' (Vidolin's journal of *Prometeo*, unpublished manuscript). The next pages of the notebook contain a series of notes, suggestions, diagrams, which have *in nuce* the musical material that will lead to the definitive computer part of *Prometeo*. For example, during the first meeting Vidolin wrote: 'winds: from zephyrs, very sweet, very pleasurable, to tornadoes, all on the move'. Regarding this, Alvise recalls that:

one of the first musical paths was intended to create sounds for the simulation of breaths and blows; these could transform from feeble zephyrs into sort of tornadoes, in constant change. But this instrument turned out to be excessively automatic, not very musical. (Personal communication, 27 July 1999.)

So we decided not to use it. Nono thought these sounds structures were too much pre-composed. Why use a pre-composed structure when one has the possibility to use the 4i system, a real time digital sound processor? That was what he told us. (personal communication, 1st June 2009.)²

For the computer part of *Prometeo*, Luigi Nono took also inspiration from everyday acoustic phenomena. Vidolin recalls that one day Nono came at CSC. He was excited because he had just listened to some 'snaps' while sailing in his motorboat; it was a window of the motorboat banging in the wind. He decided he wanted to recreate a similar rude, violent, noisy effect. They did so, but in the end they decided not to include them in the Venice version of *Prometeo*, only in Milan (the second version) in 1985 (Vidolin personal communication, 1st June 2009).

4. CARL FAIA

Carl Faia is an American/French Computer Music Designer, composer and performer. Since 1995, he has been active at IRCAM in Paris, and at the CIRM in Nice. He has collaborated with numerous composers including James Dillon, Jonathan Harvey, Harrison Birtwistle, Fausto Romitelli, Luca

Francesconi, Alejandro Viñao, Philippe Leroux. He has also worked for the preservation and the performance of several pieces with updated technology. Carl Faia is an important case of study for many reasons. In his website, he lists 61 collaborations and sets up a list according to the type of project: R = real-time project, S = Studio project, C = combined project, P = portage (the porting of one piece with updated technology). This separation is to say that the activity of a computer music designer is multifaceted, but also very clearly defined. In fact, besides Vidolin, Faia is one of the very few Musical Assistants who has also discussed the theoretical and conceptual framework of his profession. In 2014, he defended his doctoral dissertation, titled *Collaborative Computer Music Composition and the Emergence of the Computer Music Designer* (Faia 2014). This source is particularly useful for two reasons: 1) it summarizes Faia's activity through the consideration of a series of collaborations with composers over 18 years; 2) it indicates that the self-awareness of this activity as an independent *metier*, has reached a point where these professionals are validated within the realm of music creation.

Carl Faia's dissertation is a goldmine, because it presents the logbook of his collaborations with Philippe Leroux, James Dillon, and Jonathan Harvey among others.³ The following quotation discusses the first phases of his work with Philippe Leroux for the piece *M* (1997), for two percussions, two pianos, and electronics (dedication to Carl Faia).

As this was the first time I collaborated with a composer at IRCAM, I learned that the typical steps in a collaboration would be meeting the composer and discussing in detail the work. These early meetings would involve technical discussions, as well as a certain social aspect that is not definable. Working out the technical and practical understanding the composer has for electronics, understanding the wants of the composer and already trying to build a glossary of usable definitions for descriptions of sound that are non-technical (like saying 'really soft' for pp): what does blue metal sound like? (Faia 2014, 22.)

This passage emphasizes three concepts that typify a composer/musical assistant collaboration. The first one is the technical discussion: the musical assistant explains the last outcomes in technology or psychoacoustics, he creates examples to hear and explore. Something that prompts Faia to say: 'sometimes this might seem a little like showing off your trick pony while the buyer decides if he wants that one or not' (Faia 2014, 22). The second point is the composer's level of technical know-how, a crucial aspect that influences the composer/musical assistant collaboration toward one or the other side. The third point is glossary, or more generally communication aspects between the musical and the technical world. Both actors need to create a mutual language, clear enough to find common ground between the composer's musical/aesthetical needs from one hand, and the technological specific terms used by the Musical Assistant.

In his PhD dissertation, Carl Faia is also sincere about problems and difficulties they had during the creation of this piece. When working with Philippe Leroux in 1997:

² Original tapes of these experiments and their digitization are held at the Luigi Nono Archive in Venice. Both quotations are cited also in Zattra (2018, 90).

³ It also illuminates historical facts related to technology and the use of technology at IRCAM.

I was doing the bulk of this [analysis of data],⁴ on the mainframe computer [at IRCAM] which meant that during my processing, any other user on the system was reduced to a fraction of a percentage of the computer processor and checking email could take several minutes instead of seconds. This is where my ignorance showed and I was quickly corrected and just as quickly learned how to program the necessary analysis during the late night hours when I would not bother other users. (Faia 2014, 24.)

This technical problem is also important from an historical viewpoint, because it reflects the practical conditions of the time. Hardware capacity was smaller and slower than at present, and big data analysis could affect the work of other people at the Institut.

5. COMPARING THE THREE CASE STUDIES

A comparison of the sources, stories, and behaviours of Marino Zuccheri, Alvisé Vidolin and Carl Faia, provides the opportunity to understand the collaborative process from different perspectives: division of labour, expertise/specialization, synchronicity or diachronicity, psychology, preservation, authorship.

5.1 Division of Labour and Expertise

The composer/musical assistant(s) cooperation can be based, according to the historic period, on a highly structured relationship or a looser connection. Vera John-Steiner (2000) proposes degrees of collaboration. From one hand of the spectrum, distributed collaboration is the case where participants work on informal shared interests; at the other end of the spectrum we find integrative collaboration where participants work in intense, committed partnership, so close that they transform each other's practices:

the most common form, complementary collaboration, sits between and is characterized by clearly defined roles, distributed expertise, discipline-specific working methods, and, while all parties strive for the same goal, varying levels of commitment amongst collaborators. Rather than match each other, parties' values overlap. (Love and Barrett 2014, 52.)

I suggest that in the electroacoustic music field, musical assistants and composers, whose goal is common, are engaging in a form of integrative or complementary collaboration, depending on the case. Actors can work in intense partnership, so close that they transform each other, but they can also have defined roles, and various levels of commitment. In the ideal collaboration, there is a process of mutual learning shared at each project.

However, as I already stated in my introduction, composers of electroacoustic music can be divided into two general groups concerning their relationship to technology. The first group would be those — although rare — who are or were capable of creating for themselves works with technology. The second group, composers who are or 'were more or less incapable of creating on their own anything with technology — in whatever form —, much like Philippe Leroux' (Faia 2014, 53).

When composers want to work with highly technical innovation or their projects are very complex, or when they want to work with specific environments or technology — such the one developed at IRCAM —, having a collaborator becomes necessary. From this exchange arises new knowledge on both sides. On the one hand, composers cannot learn all specificities about the electronic instruments — except in rare cases of autonomous composers; on the other hand, Musical Assistants must have a basis of musical training, but cannot attain a professional level of expertise in music composition.

Nonetheless, this dichotomy varies depending on the historical period. During the analogue era, where technologies were very manual, the process of creation was very manual too, and required several 'hands'. For this reason, composers could attain a certain level of dexterity during the process of mutual learning, which was the case of the collaboration between Marino Zuccheri and Luciano Berio.

The Computer Music Period is much more specialized. Composers are nearly forced — at least in the early computer music era, until the 1990s and the development of software such as Max/MSP — to collaborate with a highly specialized professional. The study of Carl Faia's activity — particularly his collaboration with Jonathan Harvey — reveals that there is also a lack of tools that could simplify the machinery usage to composers. Faia, for example, is always working in order to create a sort of 'meta-tools' that should help composers in getting closer to technology. This does not necessarily mean that composers depend on Musical Assistants. As stressed before, it is a mutual learning process. 'I am also part of the creative process that is, mostly, private and part of the composer's process. I will sit with a composer as he composes', said Faia (2014, 19). Musical Assistants have the privilege to enter the composer's world. 'I will experiment with ideas, [theirs] or mine or ours, that may be important in the final work... or not. There is time, effort, discussion, research, creation and finally, -more time as essential ingredients to the collaborative process (Faia 2014, 19–20).

5.2 Diachronicity vs. Synchronicity in Collaboration

Keith Sawyer differentiates the temporal pattern in music collaboration in two types. 1) Diachronic collaboration occurs when each participant's contribution occurs at a different moment in time — and/or at different physical places —, and the creative contribution could be separated by days or weeks. 2) Synchronic collaboration occurs when the actors occupy the same place at the same time. They continuously monitor each other, and interact immediately (Sawyer 2014, 274–5).

Marino Zuccheri's collaborations were synchronic, because of the manual analogue equipment, at least from most of the sources.⁵ Vidolin and Carl Faia's collaboration, conversely, were both diachronic and synchronic. They met with composers and worked at the studio, but they also worked each one on their own after the meetings.

⁴ Data were created in the form of dynamic partials of single sampled low piano notes. They were subsequently morphed from one sound segment to another (Faia 2014, 24).

⁵ Yet, one letter (unpublished) held at the archive of the Studio di Fonologia della RAI demonstrates that there was diachronicity as well, as I showed in (Zatra 2017) concerning the collaboration between Luigi Nono and Zuccheri.

5.3 Psychology

The activity of the Musical Assistant is not only a series of tasks and competences, it also involves social and psychological skills. ‘We got on very well in the respect of our different competences’, said Marino Zuccheri (in interview with De Benedictis 2000, 178). Carl Faia emphasises that ‘the process of collaboration is never completely natural and requires effort from all parties. While my experience as composer allowed me a sense of empathy and understanding, there would be differences in age, background social standing, education and gender that would all play a role in the work itself’ (Faia 2014, 20–32). Collaboration also creates special bonds. This is clear in Marino Zuccheri’s quotations, and in Carl Faia’s, who reveals — recalling his collaboration with Philippe Leroux — that:

there existed a certain complicity that is difficult to imagine and even harder to explain to outsiders. It is a privileged complicity and has allowed me from this piece onward [M] throughout my career, to work with many composers and artists to create something unique, something that could exist only because there was this complicity and these two particular people working together in the studio in total confidence with each other [...]. I do see how the relationship changes once this creative period is over and we return to our respective spaces and social/professional ‘norms’ take over. (Faia 2014, 35.)

For Alvis Vidolin, it is a matter of empathy, as recalled in chapter 3: ‘to understand the composer’s vision. This is possible only through dialogue, empathy and even imagination: as in any relationship, it is not always easy to decipher others’ mind and intentions’ (personal communication, 12 April 2013, cited in Zattra 2018, 87).

5.4 Communication and Tools for Communication

Another important topic is communication: how composers and musical assistants interact, how they explain each other’s competencies; an issue inevitably linked with psychological aspects. Carl Faia is the most open on the subject.

There is also a certain metaphoric starkness that inevitably appears when assumption meets reality and we start working on the details of a project. Our respective ignorances become evident and we need to have confidence in the other to reveal what we don’t know or know incompletely. In any event, this is an important aspect of collaboration, as is the psychological interaction that might be important in certain projects. (Faia 2014, 21.)

As he puts it, ‘it is impossible to advance if there is not a common language. There is, by necessity, a give and take that is different but very real for every project as we work towards this common language’ (Faia 2014, 35). Finding a common language means to go beyond technicalities and specific terms. Faia works in order to create meta-tools, patches that are easier to use. When collaborating with Jonathan Harvey, he developed Max patches for the composer to ‘play’ with them, based on their discussions and the artistic project they had in mind, with which Harvey could also record the outcome. Faia calls these patches ‘composing tools’ (Faia 2014, 71).

When collaborating with Salvatore Sciarrino for the creation of *Perseo e Andromeda* (1991), Vidolin explained the composer the possible effects — mainly filtered white noise — and they found a way to notate those sounds in diagrams. This became their way to communicate. Sciarrino made those diagrams after his period of training at the CSC in Padua, and then

they were able to transform each diagram in sound and even write them in traditional notation (Zattra 2018, 95).

5.5 Awareness of the Importance of Preservation

In recent years, more and more Musical Assistants are preserving their work through archives, articles, databases and genetic documentation of their work with composers. Marino Zuccheri sources are rare and scattered — the profession was in its infancy. Alvis Vidolin is one of the first computer music designers to pay special attention to this part of his work: he wrote numerous articles and still continues to do that. Carl Faia has even written a PhD dissertation and pays special attention to preservation and porting. This growing awareness is the result of the development of literature dedicated to collaborative environments in general, and in electroacoustic music in particular, and also a growing self-confidence of this profession.

5.6 Authorship

Generally, definitions of collaboration stress that collaboration is characterized, in addition to dialogue and extended time working together, by equality and shared ownership (John-Steiner 2000; Love and Barrett 2014, 52). The last two issues are problematic in the Musical Assistant/composer collaboration. Equality is multifaceted, it depends on the relationship. Authorship remains in the hand of the composer, according to copyright policy.

‘The musicians ‘ruled’ the machines, and I made the machine work’, said Marino Zuccheri, recognizing composers’ status (in interview with De Benedictis 2000, 178). Carl Faia, however, has a more forward-thinking:

I am not challenging the place of the serious music composer or the working methods here. [...] My observations have led me to believe, however, that there is a real place for Computer Music Designers at the side of serious music composers. In the same way that it is unrealistic to imagine a composer to be an expert performer in every instrument (bar the rare Hindemithesque composer), I believe it is unrealistic to expect every serious music composer to be an expert in technology. (Faia 2014, 16.)

In a longitudinal study made in 2016, musical assistants responding to a questionnaire confirmed that there is no clear legal statutory definition of their profession, which results in various conditions of hiring and a deficit of administrative recognition. Payment arrangements could take the form of three different typologies: specific project; percentage of rights or patents; steady paycheque (Zattra and Donin 2016, 450). What is interesting to stress, is that although Musical Assistants agree when they say they expect more recognition for their artistic contribution, it seems that they do not consider their technological contribution in the same way, and have not arrived at a point of consensus (Zattra and Donin 2016, 445–6). Patenting their work, as a form of recognizing their contribution, is not seen as mandatory for many of them (Zattra and Donin 2016, 445–6).

6. CONCLUSION

This study is intended to enlighten the hidden art-science collaboration, and the traces remaining from the habitually wordless communication between composers and Musical Assistants. It follows three protagonists operating in three different epochs with different technologies, and tries therefore

to present a very broad social history of collaborative creation in electroacoustic music. It introduces questions about cooperation and the way it could induce dilemmas when considering authorship.

KEYWORDS

Electroacoustic Music, Recorded Music, Computer Music, Collaboration, Musical Assistants, Computer Music Designers.

REFERENCES

- De Benedictis, Angela, 2000. ‘...all’epoca delle valvole... Incontro con Marino Zuccheri’, in Angela Ida De Benedictis and Veniero Rizzardi (eds.), *New Music on the Radio*, Torino: CIDIM/RAI-ERI, 177–213.
- Eco, Umberto, 2008. ‘Musica’, *La Repubblica* (29/10/2008).
- Faia, Carl, 2014. *Collaborative Computer Music Composition and the Emergence of the Computer Music Designer*. PhD diss. London: Brunel University.
- Gyger, Elliott, 2014. ‘Mapping Composer-Performer Collaboration’, in Margaret S. Barrett (ed.), *Collaborative Creative Thought and Practice in Music*. London: Routledge, 33–48.
- John-Steiner, Vera, 2000. *Creative collaboration*. Oxford/New York: Oxford University Press.
- Kahn, Douglas, 2012. ‘James Tenney at Bell Labs’, in Hannah B. Higgins and Douglas Kahn (eds.), *Mainframe Experimentalism: Early Computing and the Foundations of the Digital Arts*. Berkeley (CA): University of California Press, 131–46.
- Love, Karlin, and Barrett, Margaret S., 2014. ‘Learning to Collaborate in Code: Negotiating the Score in a Symphony Orchestra Composers’ School’, in Margaret S. Barrett (ed.), *Collaborative Creative Thought and Practice in Music*. London: Routledge, 49–64.
- Orlarey, Yann, 2015. Presentation of master RIM (Réalisateur en Informatique Musicale). Saint-Étienne, Université Jean-Monnet. (Unpublished.)
- Plessas, Peter, and Boutard, Guillaume, 2015. ‘Transmission et interprétation de l’instrument électronique composé’, Proceedings of the *Journées d’Informatique Musicale (JIM 2015)*, <http://jim2015.oicrm.org/actes/JIM15_Plessas_P_et_al.pdf>, accessed 28/06/2023.
- Sawyer, Keith, 2014. ‘Musical Performance as Collaborative Practice’, in Margaret S. Barrett (ed.), *Collaborative Creative Thought and Practice in Music*. London: Routledge, 271–86.
- Zattra, Laura, 2013. ‘Les origines du nom de RIM (Réalisateur en Informatique Musicale)’, Proceedings of the *Journées d’Informatique Musicale (JIM 2013)*, <<http://jim.afim-asso.org/JIM2013/>>, accessed 28/06/2023.
- , 2017. ‘Origins, Dynamics and Evolution of Collaboration at the Studio di Fonologia della RAI in Milan (1955-1983)’, paper presentation at the conference *TCPM – Tracking the Creative Process in Music*. Huddersfield: University of Huddersfield.
- , 2018. ‘Alvise Vidolin interviewed by Laura Zattra: The Role of the Computer Music Designers in Composition and Performance’, in Friedemann Sallis, Valentina Bertolani, Ian Burle and Laura Zattra (eds.), *Live-Electronic Music. Composition, Performance and Study*. London: Routledge, 83–100.
- Zattra, Laura, and Donin, Nicolas, 2016. ‘A Questionnaire-Based Investigation of the Skills and Roles of Computer Music Designers’, *Musicae Scientiae* 20/3: 436–56.