Sound Work: Composition as Critical Technical Practice

Edited by Jonathan Impett

SOUND WORK

COMPOSITION AS CRITICAL TECHNICAL PRACTICE

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Online Materials

As further reference to chapters 2 (Rosenboom), 4 (Warde), 5 (Brown), 9 (Romero), 11 (Fantechi), and 14 (Alessandrini and Zhu) in this book, an online repository of multimedia files was created to enhance the reading of the relevant chapters. The material is hosted on the website of the Orpheus Institute, Ghent. These examples, which should be viewed in connection with a reading of the relevant articles, may all be accessed under the URL: https://orpheusinstituut.be/en/sound-work-media-repository.

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Collaborative Creation in Electroacoustic Music

Practices and Self-Awareness in the Work of Musical Assistants Marino Zuccheri, Alvise Vidolin, and Carl Faia

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1. What is a musical assistant?

"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 statement, by musical assistant and computer music designer Carl Faia, introduces us to the double theme of this chapter. If music is the ultimate collaborative art form, the art of organised sound with analogue or digital technology (sonic art or sound-based art, particularly as practised in electroacoustic music)[1] is collaboration at its best. In this chapter I will portray collaboration as it is viewed by those actors (one of whom is in fact Faia) who work closely with composers, and the traces remaining from this collaboration—a habitually wordless communication.

Unlike "traditional" acoustic music, where the actors are composers, performers, and directors (and where there is still a persistent myth or illusion that composers are the lone creators responsible for everything within the creative

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[1] I refer, here, to the definition of sound-based art given by Leigh Landy in "But Is It (Also) Music?" (2017): "both note-based and sound-based works" (17) that were created "over the last century catalyzing an ongoing need for a broader definition of music" (19). For those interested in the important issue of terminology (sonic art, sounding art, sound-based art, sound art, electroacoustic music, electronic music, etc.), Landy's article is essential reading. In this chapter I will oscillate indistinctly between the use of *sound-based art* as an umbrella term, and *electroacoustic music*, historically a more often used term, as for example in the "bible" (for musicologists) *The New Grove Dictionary of Music and Musicians*. Electroacoustic music indicates "[m]usic in which electronic technology, now primarily computer-based, is used to access, generate, explore and configure sound materials, and in which loudspeakers are the prime medium of transmission" (Emmerson and Smalley 2001, quoted in Landy 2017, 19). Historically we consider the period to start with musique concrète in 1948 and Elektronische Musik in 1950, with computer music starting in 1957.

chain of musical production),[2] sound-based art and particularly electroacoustic music are characterised from the start by a high level of teamwork. The revolution in sound recording, synthesis, and transformation from the late 1940s has involved the presence of different individuals with varied roles, who regrettably have often been concealed from the official literature. My research (Zattra 2013, 2018a; 2018b; 2018c; Zattra and Donin 2016) has tried to unveil these "invisible collaborators" (to quote Shapin's famous 1989 article), as also did Jennifer Iverson (2019) in her brilliant investigation of the Cologne WDR Studio.

The general framework of my chapter considers the practice of musical assistants in electroacoustic music.[3] His or her part in the creative process is to manage the technical set-up of a new musical piece, to help the composer cope with technologies and scientific knowledge, to translate the composer's aesthetic world into programming languages, and to take part in the performance of the piece (Zattra and Donin 2016, 437). The musical assistant acts as an "interface" between composer and technology, creation and research. His or her name has been loosely applied or even changed over the years. I will here use the term *musical assistant* most often, but historically the expressions technician, tutor, computer music designer, music mediator (Zattra 2013), Klangregisseur, live electronics musician, and digital audio processing performer (Plessas and Boutard 2015) have also been used. Analogue or digital instruments—depending on the historical period we are considering—may serve to develop compositional ideas and material, explore musical ideas, and perform a musical piece. Still, while traditional instrumental music has developed quite standardised systems for writing acoustic instrumental or orchestral music, in the electronic world it is unrealistic to think this equally possible and to imagine composers as perfect connoisseurs of those techniques. There are some composers who are also performers and professional electronic instrument experts. But they are the exception, because electroacoustic music requires highly specialised skills. In fact, until recently only a few composers

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2   This is not the place to discuss the ontology of music in much detail. It seems, however, important to remember that this myth remains, at least among music listeners, despite the efforts of scholars from different disciplines who have tried to dismantle this rhetoric over the decades. The dualism works-composers introduced by the father of musicology Guido Adler in 1885 has been undermined, for example, in the seminal work by Lydia Goehr whose social history of music revised the strong work-concept "composer-score-performance" and the resulting "imaginary museum of musical works" (Goehr 1992). The approach of STS studies (science, technology, and society studies) is analogous (Pinch and Trocco 2004), as are studies that investigate musical organology: examples of which include the history of the Wagner tuba (Melton 2008), or the philosophical theory that music begins with the handling of musical instruments and the physicality of musicians (Sève 2013). On the other hand, twentieth-century music and creativity have gradually become more cooperative in breaking down this myth, for example, graphic, aleatoric, and Fluxus scores and improvisations or certain interesting cases of music co-creation and co-composition in works by Luigi Nono and his collaborators.

3   We must not forget that the term *musical assistant* has also been loosely applied over the course of music history, to a musician, translator, or interpreter of musical ideas (copyist, amanuensis, transcriber, etc.) who works alongside the composer to transcribe working documents, arrange musical pieces, develop rough ideas provided by the composer, and assist in the direction of a performance. Among many examples, I could cite the working relationships of Joseph Joachim Raff and Franz Liszt, Imogen Holst and Benjamin Britten, Alex Weston and Philip Glass, or even more complex relationships such as Ernst Krenek and Paul Bekker, Robert Craft and Igor Stravinsky, and Joseph Joachim and Johannes Brahms. To assist means to "help (someone), typically by doing a share of the work," "from Latin assistere 'take one's stand by,' from ad- 'to, at' + sistere: 'take one's stand'" (Lexico 2021).

had been able to generate electroacoustic music pieces autonomously, from the first conception and synthesis to the diffusion of sound.[4]

More specifically, while in the past I have investigated the socio-professional status, profile, practices, and expertise of musical assistants in electroacoustic music (see my aforementioned articles), here I concentrate on comparing specific examples of collaboration and focus in particular on three musical assistants, their strategies in action, and their self-consciousness issues. The musical assistants I am considering are Marino Zuccheri (who was active primarily during the 1950s and 1960s), Alvise Vidolin (active from the end of the 1970s to the present day), and Carl Faia (whose activity began during the 1990s and still continues). 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), and Philippe Leroux and Jonathan Harvey (Faia). The main reason for presenting these three cases is their focus on constructing a narrative of their collaborations, which is reflected in the archiving, conservation, technological migration of their outputs, and maintenance of their writings, sketches, diaries, and documentation (especially Vidolin and Faia), as well as their willingness to give interviews.

Thanks to their openness and awareness of the importance of documentation, it is possible to trace analogies and differences in their time management, areas of expertise, problems, communication, coordination, and modes of thought, which are also motivated by historical and technological circumstances. In examining this collaborative framework, I propose that collaboration in electroacoustic music continually prompts both composers and musical assistants to perform typical actions that are required in design and design thinking, as described by Nigel Cross (2006): context analysis, tension between "problem goals" and "solution criteria," establishing "problem frames" in order to find solutions, creative thinking, sketching and prototyping, testing, evaluating, and delivering (ibid., 74). In fact, on the one hand, musical assistants need to imagine what composers have in mind when they communicate their musical aesthetic vision, or their ideas about timbre, interaction, and musical form ("the mind set of computer music designers is different from the mind set and vision of composers" says Alvise Vidolin [pers. comm., 27 July 1999])—the translating process into sounds, codes, data, and algorithms needs to negotiate the possibilities and constraints of the technologies, running the risk of diminishing or changing ideas. On the other hand, composers ought to understand the technological framework and decide whether to remain within those possibilities and 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) ethnographic research, as it is a collaboration based also on oral traditions and activities; (3) philology of

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4 Of earlier practitioners, we could cite John Chowning, Jean-Claude Risset, and James Tenney, who were simultaneously composers, researchers, and computer programmers (Kahn 2012, 131–46).

music and source criticism. I report findings based on archival research—published and unpublished sources (written, oral, and video) and administrative documents—conserved at different archives: the archive of the Studio di Fonologia della RAI in Milan (now digitised and held at the Archivio dello Studio di Fonologia, Associazione NoMus, Milan), IRCAM (Institut Recherche et Coordination Acoustique/Musique) in Paris, and CSC (Centro di Sonologia Computazionale) in Padova; and the private archives of Alvise Vidolin and Carl Faia. Heterogeneous sources help reconstruct Marino Zuccheri's, Alvise Vidolin's, and Carl Faia's approaches to collaboration (sections 2–4). Their comparison (section 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 musical assistant at the Milan RAI (Italian Broadcasting Company) Studio di Fonologia.[5] He helped Luciano Berio, Bruno Maderna, Luigi Nono, Henri Pousseur, and John Cage, among others, in giving birth to their musical works (Novati, Pronestì, and Vaccarini 2018). To understand the importance of Zuccheri's contribution, I will cite semiotician and cultural critic Umberto Eco, who actively participated in the studio's activities. Eco suggested in 2008 that Zuccheri's contribution was so important that in some cases electronic pieces credited to other people 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 was not long enough to master all nine oscillators' secrets, the great Marino Zuccheri would put together an acceptable composition with a couple of manoeuvres, thus many electronic music incunabula are his and not from those authors who signed them. (Eco 2008, my translation)[6]

Without questioning the place or authorship of avant-garde music composers, it is interesting to stress that we learn from this quotation that composers certainly came to the studio with their own visions, musical backgrounds, and aesthetic peculiarities; however, without Zuccheri's dexterity (and the machines created by physicist Alfredo Lietti, the first technical director and designer at the studio), there would be no musical outcomes. "Technicians from the first analogue era of electroacoustic music . . . , like Marino Zuccheri at the Studio di

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5   Zuccheri worked first as a telegraphist for the Fascist-era radio network EIAR (Ente Italiano per le Audizioni Radiofoniche, the public service broadcaster in Fascist Italy) in Bologna in 1942, then as a wireless radio operator for the Italian military; he participated in the partisan resistance and in 1950 was appointed at RAI until his retirement in 1983 (Helms 2020, 141).

6   "Passavano di lì tutti i protagonisti della Neue Musik e sarà giustizia ricordare che, siccome molti avevano delle specie di borse per un periodo di studio a Milano, ma alla fine del periodo dovevano presentare una composizione finita, e il periodo non era stato sufficiente per impadronirsi di tutti i segreti dei nove oscillatori, il grande Marino Zuccheri manovrando di qua e di là metteva insieme una composizione accettabile, sì che molti incunaboli della musica elettronica sono dovuti a lui e non agli autori che li hanno firmati."

Fonologia . . . , can be seen more as cinematographers or directors of photography," Alvise Vidolin said; "these technicians had a crucial role to play, just as technicians did in . . . film production" (pers. comm., 12 April 2013; quoted in Zattra 2018b, 86). However, collaboration at the studio differed from case to case. Zuccheri later recalled 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 and De Benedictis 2000, 178)

Zuccheri emphasises that "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 which such people: to be where you discussed art" (ibid.).[7] Zuccheri's role, as he perceived it, was not marginal. Alongside Zuccheri, physicist Alfredo Lietti understood the musical requirements of composition and, helped by the other technicians at RAI, designed and translated those needs into electrical circuits. Writing in 1956, one year after the opening of the studio, Lietti was well aware of those difficulties: "The musician may have a clear idea of the sound he wants to create, but this is obviously a musical idea. On the other hand, if the sound is to be created electronically, the technician is interested in its physical characteristics. It is clear that this difficulty can only be overcome if they make an effort to understand one another" (Lietti 1956, quoted in Vidolin 2012, 20).[8] Lietti was the skilled designer; Marino Zuccheri (and Luciano Berio, founder of the studio and its first director) listened and decided whether the new instruments were good enough to create interesting sounds. If not, they started all over again. Once ultimately approved by Zuccheri, each device was controlled by the capable hands of Zuccheri himself (Lietti 1959, 41, cited in Rodà 2012, 34).

   While the technical equipment was set up by Lietti, Zuccheri was the link between the technical and musical worlds. Luigi Nono, who worked at the studio, was the first composer, to the best of my knowledge, to try to define the musical assistant's status. Nono wrote that Zuccheri was a "true musician-technician-theorist-practical-teacher-interpreter-performer of uncommon virtuosity, extremely humane in his desire to understand and participate" (Nono 1986, 176; also quoted in Vidolin 2012, 20). Marino Zuccheri invented

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7   "The traditional approach of early electronic music studios was to assemble electronic devices already available in broadcasting companies, such as oscillators, ring modulators, tape recorders. This approach required a lot of tweaking and adaptations from the original aim for which these devices were designed, and induced severe constraints on the possible musical use. Instead, the Studio di Fonologia Musicale di Milano was conceived since the beginning as *a new musical instrument for a new musical practice*. The far-sighted and creative intuitions of composers such as Luciano Berio and Bruno Maderna met the technical skills and attention to musical needs of physicist Alfredo Lietti and technician Marino Zuccheri" (De Poli 2012, ix).

8   On a historical note, at the Studio di Fonologia, the WDR studio in Cologne and the GRM studio in Paris, machines and personnel were the same as they had been during the Second World War. Lietti was employed at RAI during the war as a military officer of telecommunications (Rodà 2012, 33).

this profession for himself, since he had no predecessors (as is stressed also by Vidolin [2012, 21]). He was a tutor, a teacher, a psychologist, and a performer. "My job, other than that of sound engineer, was to be a go-between between the equipment and the musician, to try and understand as much as possible what was needed in order to realize the material sound to begin with and to indicate the briefest technical route, thus collaborating indiscriminately for the success of that composition or musical experiment" (Zuccheri 1998, 1; [1998] 2018, 54).

Of course, not all composers worked in the same way. Therefore, as mentioned before, Zuccheri's involvement varied from case to case. If we consider the creative process in analogue electronic music, consisting of synthesising, recording, splicing, and editing, we can trace different approaches to composition. According to Zuccheri, John Cage in 1958 was autonomous: Cage worked alone setting up the sound fragments and cutting and reassembling them for *Fontana Mix* (Zuccheri 1962). Describing Cage's arrival at the studio in October 1958, Zuccheri recalls: "he follows my explanations with the maximum attention and takes notes. He asks for some graphic paper, and on this he designs with great precision all the central panel containing the electronic instruments, omitting not even one of the screws! I await in silence his next decisions for the preparation of the electronic material, as usually occurs with all other composers" (Zuccheri 1962–63, 45). Instead, Cage asked him to accompany him to the zoo and other places to record city and nature sounds, and was later completely autonomous in the mixing of the tapes for *Fontana Mix*. "I insist on asking Mister J. Cage if I can start up the machines in the Studio for eventual use, but he continues unperturbed his job of cutting up tapes, talcum powder etc." (ibid, 46.). Luciano Berio had a different method of work and collaborated closely with Zuccheri on the creation of *Thema (Omaggio a Joyce)* and other pieces (Zuccheri and De Benedictis 2000, 187). Luigi Nono, who worked in the studio in the 1960s and 70s also collaborated closely with Marino Zuccheri; they accumulated a vast collection of sounds, and in the process Nono discovered "compositional principles that were innate to the material itself" (Nono 1986, 175; also quoted in Vidolin 2012, 28–29).[9] In *Notturno* (1956) by Bruno Maderna, composer and technician worked together at night.[10]

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9 They started with the sound material, said Luigi Nono in 1986 recalling his work with Zuccheri in the 1960s and 1970s: "we would listen, analyse, discuss and then decide how to proceed. / It was all put together on another four-track tape, adding further variation and modifications on each track. / The result was the 'sum' of 16 tracks. / Then again on another four-track tape = 64 tracks all of which were different. / We tried different tempi—synchronous or asynchronous starts, different intensities different pitch modulations (micro-macro intervals)" (Nono 1986, 175). The first work to use spatialisation at the studio was *Intolleranza 1960* by Nono (realised 1961), created with the help of Marino Zuccheri and Bruno Maderna, and recorded on four-channel tapes. The last sound materials to be realised by Nono at the studio, with the help of Marino Zuccheri, were recordings of flutist Roberto Fabbriciani, later used for the final bass-flute section of *Das Atmende Klarsein* (1981).

10 As Maderna recalls in a handwritten note from around 1957 now in the Paul Sacher Stiftung, *Notturno* "was realized mainly at night and in secrecy with the help of the technician [Marino Zuccheri], who had already then become a very good friend of mine, because I only had very little time—officially, I had to be finished within a week—, but also because it was impossible to use the devices during normal daytime operations, when they were used for realizing smaller and larger pieces [for broadcast programmes] on short notice. When we had finished towards four o'clock and were completely exhausted, the technician and I jokingly decided to call the piece *Notturno*, commemorating the lost hours of sleep" (quoted in De Benedictis 2018, 37).

As we can see, Zuccheri left sufficient traces of the workflow and strategies of these collaborations (the NoMus archive also holds charts of the scheduling and availability of the equipment during regular working hours). I was also able to see several letters between Maderna, Nono, and Zuccheri. These are particularly interesting in order to understand the atmosphere prevailing at the studio in its first and second decades. All the letters are in Venetian, the dialect spoken within Venice and by Maderna and Nono (both born in Venice). Venetian was, according to Zuccheri (1998), the "official" language of the studio (Zuccheri [1976–77] 1986). These letters were jotted down at the end of the day, or on leaving a session, and contain comments, annotations, reminders, jokes, greetings. Some letters, especially the ones written by Nono, also contain swearing and cursing! Such words stress the intimate confidence between Zuccheri and these composers. What follows is an example of an undated memo from Nono to Zuccheri (my translation).

> Sir Marino [Sior: Venetian for "Mister"] Vualtri [your Excellency]
> [in Venetian] Please make sure that this piece does not last 2'25"—!!! [continues in Venetian] (The inspiration of Penderecki strikes me—or [unclear] Pollini), instead it lasts [?] [?unclear] until the end . . .

In the note, Nono is clearly asking Zuccheri to expand an idea of just 2:25 into a longer piece, or passage, through reference to Krzysztof Penderecki's music (we cannot know which work Nono is referring to). The close cooperation and trust between the two is clear and strong.[11]

3. Alvise Vidolin

Alvise Vidolin (b. 1949) is a co-founder (in 1979) of, member of, and researcher at the Centro di Sonologia Computazionale (CSC—University of Padova). He is a sound engineer, a live electronics performer, and a researcher. He has worked with composers including Luigi Nono, Salvatore Sciarrino, Giorgio Battistelli, Luciano Berio, Aldo Clementi, Franco Donatoni, and Adriano Guarnieri, assisting them during the creative process, and working as a performer in the first and in subsequent performances of the compositions. He has consistently taken care to preserve information pertaining to his work and the upgrading of technology. His concern for archival and conservation issues, as well as metacognition, is astonishing. I have already presented his modes of collaborations (in Zattra 2018b, forthcoming) and I compiled a bibliography of his writings (in Zattra 2009). In his texts, Vidolin discusses his role and

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11   Here is another example from a letter from Nono to Zuccheri, concerning *La fabbrica illuminata* (first performance in Venice, September 1964), about a new performance in Paris (probably the one in November 1964): "Dear Marino, I say hello 'cause I have to go. BENISSIMO! (Great!). O***a [the communion wafer, typical Venetian blasphemy]. Ragasssssi ["boys," but with Venetian pronunciation). Towards November 10th, in Paris there will be a performance of 'the Unenlightened Factory' [a pun on Nono's work's title in Venetian], etc." The letter continues with three pages of details (always in Venetian, sometimes hard to decipher) about the piece and the organisation of the performance (manuscript held at the NoMus Archive, Milan, my translation).

collaborations, issues pertaining to electroacoustic music notation, spatialisa-tion, listening, sound synthesis/processing and analysis, live electronics and performance, archiving, and audio restoration, and the history and musicology of electroacoustic music. So far, he has written hundreds of books, handbooks, book chapters, articles, conference presentations, interviews, and concert pro-grams, for practitioners and researchers, but also for more general audiences.

Here, I will only mention a few examples of his self-awareness, which reflects his commitment not only to his work but also to the definition of his and his peers' mission. He describes himself as an "interpreter of electronic music instruments," a professional capable of combining musical skills with sono-logical and signal processing know-how. This kind of musical performer "not only 'plays' during a concert but also designs the *performance environment* for the piece and acts as an interface between the composer's musical idea and its transformation into sound" (Vidolin 1997, 439). He or she "does not sim-ply translate a score into a sound, but transforms the composer's abstract musical project into an operative fact, making use of digital technology and new developments in the synthesis and signal processing" (ibid., 440).

For Vidolin, it is necessary for a musical assistant to have a series of manda-tory skills, abilities, and areas of knowledge:

> 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. (Vidolin, pers. comm., 12 April 2013; also published in Zattra 2018b, 87–88)

Dialogue, empathy, planning, and time are the keys to collaboration. This also applies to Vidolin's role as an interpreter, because he is in a position to per-form the musical work in the correct way, following the composer's intentions. For example, looking closely at Vidolin's collaboration with Luigi Nono, which culminated in the creation of *Prometeo: Tragedia dell'ascolto* (1981–84), we under-stand that they met several times, both in Padova and in Venice, during the period referred to as "Verso Prometeo" (towards Prometeo). Because Nono was not fully satisfied with the 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 2018b, 89–90). Nono and Vidolin also met in Venice, the city in which the composer lived, where they listened to typical Venetian sounds. "I kept a diary of those meetings. He made me listen to some sounds with glass bells" (Vidolin, pers. comm., 1 June 2009; Zattra 2018b, 90). Vidolin's journal (unpublished), written during the creation of *Prometeo*, is rich in infor-mation. One of the first pages marks their first meeting. "*Prometeo*, incontro

con Gigi, Aprile 1984 [meeting with Gigi (a nickname, short for Luigi)], April 1984." The notebook contains a series of comments, suggestions, diagrams, and computer printouts, which show discussions and decisions but also changes of course (discarded sounds, technical impossibilities) in the synthesis of the musical material that led to the definitive computer part of *Prometeo* (Vidolin and Nono's collaboration is discussed in Zattra, forthcoming). Vidolin was closely involved with all Nono's last productions and many works by Sciarrino and other composers. He has become their philological interpreter. His experience has made him a much-invited speaker to promote the conservation and performance practice of these works.

4. CARL FAIA

Carl Faia (b. 1962) 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, and Philippe Leroux. He has also worked towards preserving and performing several pieces using updated technology. Faia is an important case study for many reasons. On his website, he lists over sixty collaborations, providing a list organised 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 musical assistant is multifaceted, but also clearly defined.

To date, besides Vidolin, Faia is the only musical assistant who discusses in his writings the theoretical and conceptual framework of his profession. In 2014, he defended his doctoral dissertation, "Collaborative Computer Music Composition and the Emergence of the Computer Music Designer" (Faia 2014). This source is particularly useful for two reasons: (1) it summarises Faia's activity through the consideration of a series of collaborations with composers over an eighteen-year period; (2) it indicates that self-awareness of this activity as an independent métier has reached a point where these professionals are validated within the realm of music creation.

Faia's dissertation is a goldmine because it includes the logbook of his collaborations with Philippe Leroux, James Dillon, and Jonathan Harvey, among others.[12] In the following quotation, Faia discusses the first phases of his work with Philippe Leroux on the piece *M* (1997), for two percussion, two pianos, and electronics (dedicated 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

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

descriptions of sound that are non-technical (like saying "really soft" for pp): what does blue metal sound like? (Faia 2014, 22).

This passage emphasises three concepts that typify a composer–musical assistant collaboration. The first one is technical discussion: the musical assistant explains the latest developments in technology or psychoacoustics, he or she creates examples to hear and explore. This 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" (ibid.). The second point is the composer's level of technical know-how—a crucial aspect that influences the composer–musical assistant collaboration towards one side or the other. The third point is terminology, or, more generally, communication aspects between the musical and technical worlds. Both actors need to create a mutual language that is clear enough to find common ground between the composer's musical/aesthetic needs, on one hand, and the specific technological terms used by the musical assistant.

In his PhD thesis, Carl Faia is also honest about the problems and difficulties they encountered during the creation of this piece. When working with Philippe Leroux in 1997,

> I was doing the bulk of this [analysis of data][13] 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 a historical viewpoint, because it reflects the practical conditions of the time. Hardware capacity was smaller and slower than now, and big data analysis could affect the work of other people at the institute.

5. Analysis and comparison

Through a comparison of the sources, stories, and behaviour of Marino Zuccheri, Alvise Vidolin, and Carl Faia, I was able to understand the collaborative process from different perspectives: division of labour, workflow, expertise/specialisation, synchronicity or diachronicity, psychology, preservation, and authorship.

5.1. Division of labour and expertise

Composer–musical assistant collaboration can be based on a highly structured relationship or a looser connection. Vera John-Steiner (2000) proposes degrees

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13 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).

of collaboration. At one end of the spectrum, in distributed collaboration, participants work on informal shared interests; at the other end, we find integrative collaboration where participants work in intense, committed partnership, so closely 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 musical assistants and composers, who share a common goal, are engaging in a form of integrative or complementary collaboration, depending on the particular case. Actors can work in intense partnership, so close that they transform one another (Zuccheri); but they can also have defined roles, and various levels of commitment. In the ideal collaboration, there is a process of mutual learning shared in each project. However, as I already stated in section 1, composers of electroacoustic music can be divided into two general groups depending on their relationship to technology. The first group would be those (although rare) who are or were capable of creating for themselves works using technology. The second group consists of 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 innovations or their projects are very complex, or when they want to work with specific environments or technology (such as is developed at IRCAM), a collaborator becomes necessary. From this exchange arises new knowledge on both sides. On the one hand, composers cannot learn all the specificities of the electronic instruments (except in rare cases of autonomous composers); on the other hand, musical assistants must have a certain level of musical training, though they are unlikely to have attained a professional level of expertise in music composition. Nonetheless, this dichotomy has varied over the years. During the analogue era at the Milan studio, the technologies that were used required real manual labour (twisting knobs and potentiometers, cutting and splicing . . .), and the process of creation/composition was very manual, requiring several "hands." For this reason, composers could attain a certain level of dexterity during the process of mutual learning, which was the case in the collaboration between Marino Zuccheri and Luciano Berio.

The computer music period is much more specialised. Composers are effectively forced (at least they were in the early computer music era, until the 1990s and the development of software such as Max/MSP) to collaborate with a highly specialised 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 used for composers. Faia, for example, is always working to create "meta-tools" to help composers get closer to complex 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 of entering 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" (ibid., 19–20).

The general workflow process, according to my findings, usually develops in the manner shown in figure 13.1. The continually recursive actions are combinations of practical and more reflective moments that in design thinking (Cross 2007) range from context analysis to goals and solution criteria, from creative thinking, sketching, and prototyping to delivering and performing and reperforming in concerts.
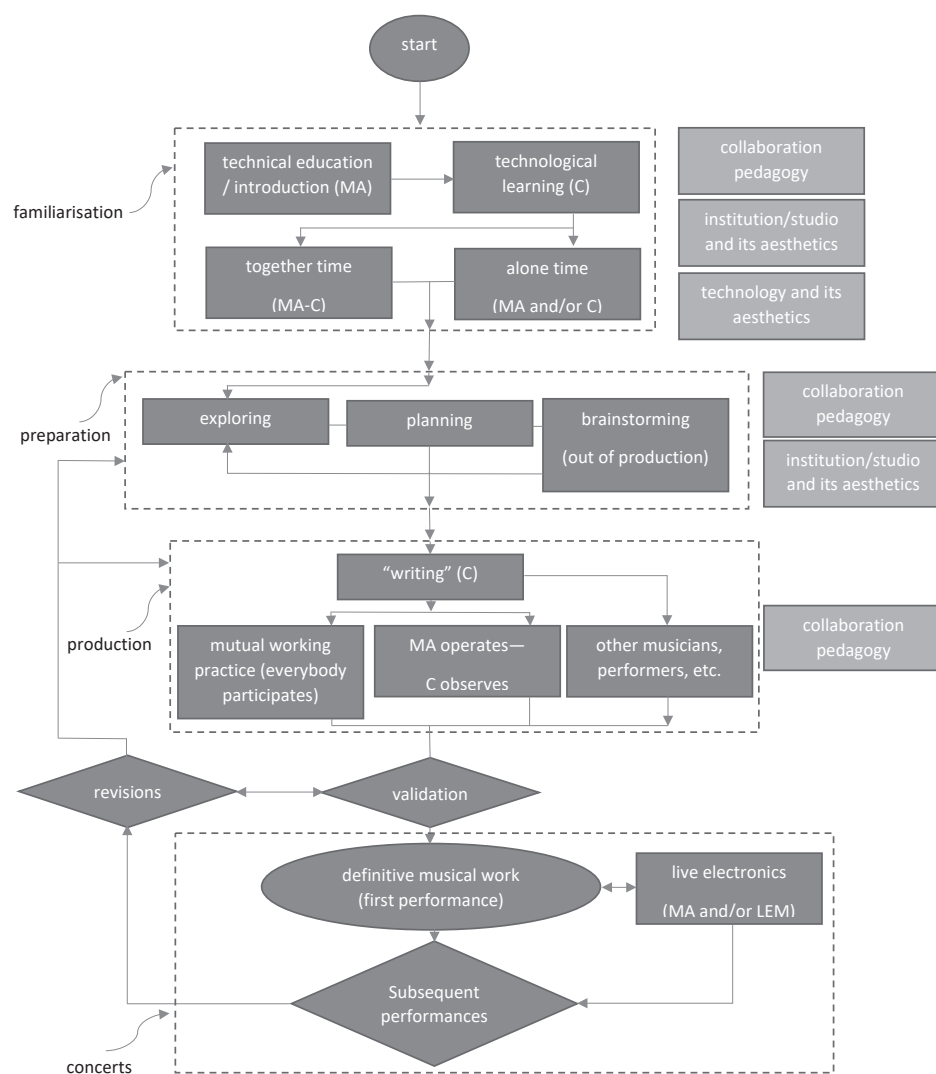

Figure 13.1.

Figure 13.1. The composer–musical assistant collaboration in electroacoustic music: typical workflow (MA: musical assistant; C: composer; LEM: live electronic musician).

5.2. Diachronicity versus synchronicity in collaboration

Keith Sawyer differentiates between two types of temporal pattern in music collaboration: (1) Diachronic collaboration occurs when each participant's contribution occurs at a different moment in time (and/or in different physical places); 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, 274–75). Marino Zuccheri's collaborations were mostly synchronic, because of the manual analogue equipment, at least according to most sources. Yet, the unpublished memo Nono left for Zuccheri asking him to prolong the sounds to last over two minutes and twenty-five seconds is proof that occasionally there could be diachronicity as well. Vidolin's and Faia's collaborations, conversely, are always both diachronic and synchronic. They meet with composers and work at the studio, but they also work on their own after the meetings.

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 . . . respect of our different competences," Zuccheri told De Benedictis (Zuccheri and 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). Collaboration also creates special bonds. This is clear in the quotations from Marino Zuccheri's and Carl Faia's writings; the latter 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 Alvise Vidolin, it is a matter of empathy, as recalled in section 3.

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, is an issue inevitably linked with psychological aspects. Carl Faia is the most open on the subject.

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> 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, 20–21)

As Faia 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" (ibid., 35). Finding a common language means going beyond technicalities and specific terms. Faia works 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, based on their discussions and the artistic project they had in mind, and with which Harvey could also record the outcome. Faia calls these patches "composing tools" (ibid., 71).

When collaborating with Salvatore Sciarrino on the creation of *Perseo e Andromeda* (1991), Vidolin explained to 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 Padova, and they were then able to transform each diagram in sound and even write them in traditional notation (Zattra 2018b, 95).

5.5. *Archiving, preservation, and technological migration*

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's sources—tapes, correspondence, sketches—were kept by him at the studio until his retirement (and were later preserved by Maria Maddalena Novati, founder of the NoMus association). However, there was no method in their preservation, since the profession was in its infancy. Still, Zuccheri recalled that he "tended to keep everything, even fragments of tape, because sometimes years later a producer would come and ask us for some effect that we already had (this tended to happen quite often for example after Bruno [Maderna] and Berio had gone)" (Zuccheri and De Benedictis 2000, 197).

Alvise Vidolin was one of the first to pay special attention to this part of his work through his writing of a large and continuing series of articles. Carl Faia has written a PhD thesis on his work and pays special attention to preservation and porting. This growing awareness is the result of the developing literature dedicated to collaborative environments in general, and in electroacoustic music in particular, and also the growing self-confidence of this profession. However, as demonstrated during an online questionnaire (in Zattra and Donin 2016, 449), there is no norm in the preservation of the output of musical assistants' work. Some archive, some candidly admit they never do so. Some

conceive their archives as private, others share them. Not all musical assistants are aware of the importance of these issues.

5.6. Authorship

Generally, definitions of collaboration stress that, in addition to dialogue and extended time working together, it is characterised 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 law. "The musicians 'ruled' the machines, and I made the machine work," Marino Zuccheri said, recognising the composers' status (Zuccheri and De Benedictis 2000, 178). Carl Faia, how-ever, takes a more forward-thinking position:

> 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)

Faia also writes that at IRCAM, under Laurent Bayle's direction (1987–2001), he took part in meetings to discuss the status of assistants:

> I went from just listening to my colleagues complain about the lack of recognition received for the work done, the amount of salary versus the number of hours worked, and the increasing demands to do more with less and do it faster, to becoming vocal and demanding as I became more experienced and understood the importance of the role we played in the structure of the institution. Briefly, these demands included a better and clearer name of our role (at that time we were called musical assistants [later they became RIM (réalisateurs en informatique musicale) or CMD (computer music designers)]), to have our names always associated with the works on which we collaborated (this would mean, in some cases, that it would be a contractual stipulation for composers or publishers), to have our biography in the back of the program along with the composer or performer, and to have a salary more in line with the role and the time that this role demanded. (Faia 2014, 53)

Whereas more and more composers are recognising, in statements, texts, arti-cles, or interviews, the important role of assistants, there are still issues in this regard from a legal and financial position, or simply in terms of recognition. In a longitudinal study made in 2016, musical assistants responding to a ques-tionnaire confirmed that there is no clear statutory legal definition of their profession, which results in various conditions when being hired and a deficit of administrative recognition. Payment arrangements are generally of one of three different types: for a specific project, a percentage of rights or patents, or a steady paycheque (Zattra and Donin 2016, 450). What is interesting to stress is that although musical assistants agree when they say they expect greater

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 (ibid., 445–46).

6. Conclusions

The purpose of this study was to explore how musical assistants perceive their profession in the art of organised sound using analogue or digital technology and, through analysis of the sources produced by Marino Zuccheri, Alvise Vidolin, and Carl Faia, and of these musical assistants' stories and behaviours, to trace an understanding of their collaborative environment, their interactions with composers, division of labour, workflow, psychology, preservation issues, and authorship. As demonstrated in a previous article (Zattra and Donin 2016, 449–50), musical assistants share a number of similarities; however, at the same time, their experiences and skills are distinctive and individualistic. Particularly in the case of the three professionals presented here, this is of course related not only to the differences between technological epochs and the different composers with whom they collaborate or have collaborated, but also to an increasing self-awareness and to an interest in documenting their profession (the archiving, technological migration, and maintenance of their writings), which is particularly clear in Vidolin's and Faia's cases. This reverberates in a developing identity, I think, in which the distinction between occupation and full profession is changing—a typical feature of emerging professions according to the sociology of work. This emerging identity is forged from a multifaceted background in music, sound technology, music performance, and programming that shapes the musical assistant's uniqueness.

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