‘Live electronic music’, Friedemann Sallis and Valentina Bertolani

Defining live electronic music is notoriously problematic and increasingly difficult (Emmerson 2007, 89-90; see also Collins 2007, 38-54; Radford 2008, 158-66). Attempts at pinning down the term are marked by the ‘plurality and hazy definitions’ that we generally encounter in electronic music (Peters 2012, 3). Furthermore, the term and the musical concepts it entails are a moving target: new developments in technology and organology continue to redefine the genre to this day. For our purposes live electronic music will be defined as performance in which the electronic part influences or is influenced by the performers in some interactive way, because we believe that this type of music can best be understood as a performance strategy rather than as a compositional technique.

Live electronic music has been part of the nomenclature of new Western art music since the middle of the twentieth century. Bruno Maderna’s *Musica su due dimensioni* for flute, cymbal and tape (1952) is often cited as the first work of this type (Deliège 2011, 153), and it does indeed stage the dichotomy inherent in the term: live (= human) electronic (= machine). In fact, surveying the notion of live performance forces us to ‘look again over the whole history of electronic music, since the drive to take such music live has been ever present’ (Collins, Schedel, Wilson 2013, 188): consider the Telharmonium (patented in 1897), the Theremin (created in 1920) and the Ondes Martenot (created in 1928). The same can be said for the Hammond organ and the electric guitar, developed during the 1930s and 1940s respectively. The same can be said for compositions that employ various types of electronic technology: Stefan Wolpe’s purported presentation at a Dada concert in Berlin in 1920 of 8 phonographs performing fragments of a Beethoven Symphony simultaneously at different speeds (Wolpe [1962] 1986, 209) or John Cage’s *Imaginary Landscapes* no. 1 for piano, large Chinese cymbal and two turntables equipped with recordings of test tones (1939). In all cases we have human performers interacting with electronically powered sound-producing devices in which the outcomes, if not precisely prescribed are nevertheless foreseen.

Most authors now agree that live-electronic music came into its own in the 1960s with emergence of compositions ‘largely based on live synthesis’ (Manning 2013, 157, see also Sanden 2013, 87-91). Composers began looking for ways to increase real-time interactivity on stage between the performer(s) and new technology. Mauricio Kagel’s *Transición II* (1959) is believed to be the first work in which sounds recorded near the beginning were then added to the work as tape loops later in the performance. Others, notably Karlheinz Stockhausen, experimented with new ways to generate and manipulate sounds produced during the course of a performance: *Mixtur* (1964), *Mikrophonie I* (1964) and *II* (1965). Much of this explosive innovation took place at newly formed centres. The San Francisco Tape Music Center (later the Mills College Tape Music Center when it moved to Oakland in 1966), founded in 1961 by Morton Subotnik, Ramon Sender and Pauline Oliveros, is a good example. The Center cultivated an ‘atmosphere of homespun improvisation’ (Brend 2012, 145), in which composers and performers rubbed shoulders with technicians and inventors. At the Center, the ‘dividing lines between performance and unsullied electronic music were always vague and productively so’ (Rockwell 2008, ix).

Fed by rapidly developing technology, musical experimentation flourished, often cultivated by loosely-formed groups of like-minded individuals. The English group Gentle Fire (1968-75) is a classic example. They explored the potential of new electronic media using a heterogeneous mix of traditional and newly invented instruments: piano, recorder, cello, percussion, Oriental mouth organs, electric guitar, synthesizers, etc. With their penchant for collective composition and their focus on performance outcomes, the group blurred the line between progressive rock and the avant-garde (Davies 2001, 55-56). Other collectives included the AMM (founded in London in 1965), Musica Electronica Viva (founded 1966 in Rome), the Sonic Arts Union (inaugurated at Brandeis University in 1966) and the Ensemble d’Instruments Électronique de l’Itinéraire, a subset of the spectralist project founded in the early 1970s (Laurendau 1990, 233)

Example 1, place photo of the EIEI 1978 here <http://lesguitaresjacobacci.free.fr/EIEI/page00.htm>

In his seminal article, Gordon Mumma (1975, 300-1) mentioned ‘live performance with computers’ as a form of live electronic music. The arrival of the desktop computer greatly enhanced the development of real-time sound synthesis embedded in performance and coincided with the establishment of large, well-endowed research institutions. The most famous is of course the Institut de recherche et coordination acoustique/musique (IRCAM) founded in Paris in 1977 by Pierre Boulez, where he composed *Répons* (1981-85). Much of Luigi Nono’s late work (1980-90), undertaken at the Heinrich-Strobel-Stiftung (Freiburg) with a dedicated group of performers and technicians, involves various explorations of new performance possibilities afforded by the technological shift from analog to digital. Works such as *Prometeo, tragedia dell’ascolto* (1984-85) are marked by the emergence of performances that transgress traditional relationships of time and place (Ungeheuer 2013, 1369-70). In other words, neither the ear nor the eye is capable distinguishing the initial sound produced by an acoustic instrument or voice from its subsequent electronic modification, creating a new deconstructed performance environment.

Finally, the end of the twentieth century bore witness to the emergence of sound installations and interactive environments in which software programs drive the performance by reacting to the acoustic properties of the performance space. For some observers this type of interactive computer music takes us out of the realm of music and into sonic arts (Demers 2010, 69-89). In this case, the traditional performer is often missing, but not necessarily the human/machine relationship. Audience members, through their presence and movement in the space, often contribute to sound outcomes and thus can be seen as participating in the performance.

Today the International Computer Music Association (ICMA) recognises following categories as live electronic music: solo instrument + electronics; ensemble (2 to 10 musicians) + electronics; laptop (+ controllers) improvisation; live coding; new interfaces for musical expression; inter-media performance; networked performance and club electro (jazz/pop/dj/idm influenced electronic music). Compositions for performer(s) and tape (a mainstay of the genre during the 1950s and 1960s and subsumed in the first category), go entirely unmentioned. Thus, rather than a linear progression we find ourselves having to confront an expanding horizon of possibilities based on archaeological layers of former practices that continue to resonate in today’s ‘up-graded’ technological environment.

But what does ‘live performance’ mean in these new circumstances? The term first emerged in English during the 1930s (1934 according to the OED) to distinguish between live and recorded performances broadcast by the BBC, a distinction which the listener was unable to make alone (Auslander 2002, 16-17). Developments in computing power have produced systems capable of real-time interaction and response, but by themselves they do not solve the problem of liveness. The late 1990s and early 2000s saw a sudden explosion in the use of laptop computers on stage. Whilst this music is certainly ‘real time’ in the sense that a performer is triggering actions and responding to them in the moment, the opaque nature of this practice from the perspective of an audience is problematic. Haworth (2015) has observed a new aesthetic of ‘secrecy, alchemy and semblance’ in computer music, expressed both in the arcane mysticism surrounding what it is that the performer is perceived to be doing or seeing, as well as the banality that it could also be far less than it actually seems (e.g. reading an email). From this perspective, the development of ‘live coding’ or the rise in new digital interfaces for gestural control of sound synthesis can be seen as different responses to the same aesthetic problem: of how to bring ‘authentic’ musical performance into computer music.

Questions also arise with regard to just what is being delivered through these performances. How do notions of composition, performance and improvisation pertain to this music? What is the relationship between the composer, the technicians and assistants, and the performers with regard to the creative process? How do they interact and how should we understand and evaluate their contributions? Are these outcomes related to the traditional nineteenth-century strong work concept or should they be understood as either an open-ended series of concert performances based on a loose but coherent aesthetic frameworks or as a form of musical experimentation (Dahlhaus 1983, 84-89)? These are just some of the questions bearing witness to a vibrant musical scene that will continue to generate problems and issues going forward.

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