

**REAL-TIME PERFORMANCE IN VIRTUAL WORLDS:
Studying Socio-Technical Environments through Multi-site Machinic Performance**

The “object is no longer to compare humans and machines in order to evaluate the correspondences, the extensions, the possible or impossible substitutions of the one for the other, but to bring them into communication in order to show how humans *are a component part* of the machine, or combine with something else to constitute a machine. The other thing can be a tool, or even an animal, or other humans” (Deleuze and Guattari, 1995).

Research Questions or Problems

This proposal investigates real-time machinic performance in virtual environments. Machinic performance is characterised by the ways in which performance can stretch across people and mechanisms, engaging different systems, rather than seeing technologies as adapted to humans or vice versa. Machinic performance, in Deleuze’s and Guattari’s sense, happens at multiple sites through multiple agents, both human and technological, and “to research a machinic performance implies to become part of it” (McKenzie, 2005).

A multi-site networked music performance can range from performing a notated score with another musician in a remote location, improvising with other performers in different virtual spaces, playing with algorithms (the other performer could be a machine), to staging a performance in a virtual world (such as the online multi-player gaming environment Second Life -<http://secondlife.com>).

Considerations of physical and virtual space are central to any technological construct that promotes social engagement, and as music performance is a field where physical, time-based, subjective and inter-personal concerns are most apparent, it is a highly suitable activity for exploring networked environments.

The questions that arise in virtual performance environments are of practical as well as of cultural nature:

- What is the performer’s and audience’s experience of performances in virtual environments?
- What type of language between performer and audience will (or will have to) develop in a virtual performance?
- How do instrumental/ensemble feedback performance strategies (such as breathing, eye contact or body movements) manifest themselves in virtual environments?
- How can we better understand a phenomenology of virtual performance environments?
- How do virtual music exchanges redefine ideas and definitions of the performative?

These questions are informed by my work as a performer of saxophone and a free improviser who regularly works in digital media environments. During collaborations with composers and digital artists working with new technologies (Carlos Zingaro, Peter Nelson, and Martin Parker for example), I experienced that, at times, the performance with such technologies (the computer, the internet, sensor technology, etc.) is informed by the technology or technological advance itself. And although it is often stated that the arts and the sciences have much to teach each other, performance in technologically mediated environments is still often shaped by technological potential, rather than according to a reciprocal motivation for the technology and its aesthetic appraisal emerging from within an artistic framework.

Aims and Objectives

This proposal promotes research topics, which are of ‘first class’ interest for performers, composers, theorists, the computer music community, and the listening public.

The main aims are to carry out performances in virtual environments in order:

- To provide critical insight into social interaction and behaviour in virtual worlds
- To better understand how instrumental/ensemble feedback performance strategies become altered in virtual spaces
- To disseminate creative practice in musical networked performances and to extrapolate insights into the nature of networked performance systems
- To enrich the research environment at the chosen institution by providing practical input of a performer
- To develop my research career by working within a future-led research culture

Through both, practice-led and theoretical research, I will produce collaborative artworks that will be publicly disseminated qua performance works and theoretical texts.

If one thinks of all human-computer interactions as “close-ups of larger socio-technical systems” (McKenzie, 2005), the research proposed here, by means of critical reflection on inherent meanings and on the social and cultural changes that network technologies create, will contribute to the advancement of our insights and understanding of socio-technical systems.

Research Context

Through computer network based practice, music performance is facing a drastic reappraisal. The area of real-time networked music performance is a growing practice, which, unfortunately, is under-explored by professional musicians.

Instrumental music performers (excluded here is the computer music performer) tend to be the last ones to engage with new technological developments. Practice-led research at an international level, however, demonstrates the importance of networked performance for current work in music technology. Examples of research that has dealt with aspects of networked music performances include:

- The Hub (1984): started network music performances using computer-controlled music synthesizers, not instrumental musicians. (www.turbulence.org/blog/archives/000847.html)
- Sound WIRE (Sound Waves on the Internet from Real-time Echoes) (1992-present) at the Center for Computer Research in Music and Acoustics (CCRMA, Stanford University/USA - <http://ccrma.stanford.edu>) headed by Chris Chafe. (<http://ccrma.stanford.edu/groups/soundwire>)
- Multimedia Tele-Concert (1994): a networked performance project with MIDI Instruments was initiated. Performers included Morton Subotnick, David Rosenboom, Steina Vasulka, Leo Smith and J.B. Floyd. (www.ecafe.com/1994.html)
- KromoZone (1999-2002): Stephan Moore and Timothy Place, using Max/MSP/Nato. (www.electrotap.com/kz/)
- Quintet.net (1999): and interactive network performance environment by Georg Hajdu using Max/MSP. This environment also adds graphical imagery for interaction. (www.opensoundcontrol.org/papers/quintet_net)
- The Distributed Immersive Performance (DIP) group (2003), of The Integrated Media System Center, University of Southern California, USA. (<http://imsc.usc.edu/dip/index.html>)
- Music On-Line project (2004: University of York led by Dr. Tony Myatt): used internet- video conferencing to coach professional orchestras over a network. (www.york.ac.uk/admin/presspr/pressreleases/onlineorchestras.htm)

The Sonic Arts Research Center/Belfast (SARC) is one of the few centers in the UK that actively pursues networked performance environments and has established strong links with CCRMA in the US.

The majority of existing research in this area is preoccupied with technological implications of multi-site networked machinic performance. This proposal addresses issues that are currently under-explored, such as:

- Engaging performers, as their practical considerations and embodied knowledge are integral ingredients in the present and future application of music performance and technologically informed spaces. A performer's bodily engagement, developed over many years through daily human-to-human interaction, and particular systems

of thought are invaluable for illuminating the engagement with technologies, their development, as well as their social and cultural impact.

- Conceiving of machinic performances that sufficiently stretch across people and mechanisms and question the nature of performance itself, rather than performance systems that emerge directly out of the availability and ability of a particular technology. A performance that solely serves as a demonstration for technological innovation does not constitute a machinic performance (the Brain Opera project by Todd Machover is an example of this; here the performance becomes a display arena of many of the MIT Media Lab's interaction technologies: <http://brainop.media.mit.edu>).
- Exploring the inherent shortcomings of network technology [consider aspects of quality of service (QoS), including delay, jitter and lossiness or dropouts]. Art that takes technology as a medium also needs to be seen as art that is directed against that technology. This means that the shortcomings of technology can be used to inform artistic practice, and indeed, that they become highlighted in new and challenging ways ("A-Synk", one of my recent live performance works, with the duo "laut" and percussionist Pedro Carneiro, using internet audio chat client explores the music's development as shaped by the limitations of bandwidth, unpredictable delays and interruptions inherent in audio chat technology).

Cultural Reflections

Visual and cinematic arts are commonly featured in literature that addresses cultural implications of new technologies for art practice (Manovich, 2000). Music literature tends to concentrate on specific technological design for interaction, synthesis and sound production (Rowe 2001, Winkler 1998). Critical and cultural study of music performance in technology-rich art settings makes for a rather limited literature. Some of my recent papers and my PhD thesis attempt to enrich the performance music discourse by drawing on theories of embodiment (see publications list). These issues are also investigated in an upcoming issue of the Contemporary Music Review (Routledge), which I am editing at present.

Theoretical Implications

Theories of network cultures have been proposed in Auslander (1999), in Marc Taylor's insightful writing on emerging network cultures (2000), and in Duckworth's recent book (2005). The texts (2002) of media artist Johannes Birringer (Research Fellow in Live Art/Nottingham Trent University) and the online discussion forum on network-enabled performances (www.turbulence.org) can be of particular interest to this research.

The main body of literature for this project will consist of writings that deal with systems of thought rather than with technological design. My thinking as a performer and my recent theoretical output is informed by an interdisciplinary approach to music performance in technological environments, in which I draw on sources as diverse as Deleuze's rhizomatic proposals (1988), the phenomenology of Merleau-Ponty (1962), the anthropological writings of Victor Turner (1982, 1987), or Michel Serres' thoughts on the evanescence of the body and the temporality of the senses (1998). The recently published "Book of Touch" (Classen, 2005) will be of particular interest in this context with view to the absence of touch in virtual worlds.

Research Methods

Two main research methods will be used for this work, the primary one being practice-led (1), the other an ethnographically informed study (2) of socio-technological systems:

1. Networked performances with local and international performers will be staged as a pilot project. These will include free improvisations, newly composed works by SARC composers, a “networked” version of contemporary repertoire pieces, (such as Cage’s Number Pieces “Four⁵”, “Five⁴” or “Hymnkus” that use saxophones). These initial performances will be recorded, edited and annotated, and are intended as a testing ground for:
 - Elucidating performative concerns (the gestural vocabulary between performers in different physical locations)
 - Examining the cultural, technological and performative implications of virtual performance environments
 - Reflecting on the design of current network system architecture
2. Ethnographically informed studies will be conducted in the form of interviews (in real and virtual spaces) with performers and audiences (real and virtual, i.e. avatars). The questions will aid in determining people’s performance experience and their social engagement.

The rationale behind staging several performances is to allow for changes in machinic environments (i.e. performing solely with audio, and/or video feedback, agreeing with other performers on using a certain gestural vocabulary or particular visual cues).

All performances will be recorded as AV (audio/video), and consultation of this material will be used to address the research questions outlined above.

Feedback from the interviews as well as the test performances will in turn inform the development of the practice in the next stages of the research.

A particular aspect of quality of service (QoS), or the particular ideas and performative concerns of a performer (to perform based on eye contact to the exclusion of ensemble breathing for example) will shape the musical structure and intent of the next performance situation.

Management of Project

Timetable/Milestones:

Year 1:

- Review the current literature and field studies on networked performances and related fields
- Contribute to the design of new performance environments. This includes collaboration with a multidisciplinary team at SARC (Dr. McAllister – Computer Science, Dr. Van Walstijn – DSP, Dr. Rebelo – Composition/Digital Arts, Dr. Anagnostopoulou – Music Informatics), as well as liaising with international groups (such as at CCRMA). The system will be primarily designed with view to a performer’s practical, rather than technological, concerns (design of interface, multi-channel audio and video links)
- Stage two test performances with local improvisers at remote locations and with an international group, such as found at CCRMA, Stanford. Contacts have been established with CCRMA (see letter of support from Professor Chris Chafe)
- Conduct interviews with performers, the computer music community, and the listening real and virtual community

Year 2:

- Evaluate the feedback from the interviews, and with this in mind
- Carry out four further live-networked performances (with local and international performers, as well as within a virtual gaming environment, such as Second Life). The performances will simultaneously take place in SARC’s Sonic Laboratory
- Continue and refine the interviews with participants
- Catalogue and annotate AV recordings of networked performances carried out in Year 1
- Provide critical re-examination of systems in use, reflect on the cultural, technological, as well as performative implications in form of two international journal/conference papers (submitted to refereed journals such as Leonardo Music Journal, Leonardo Electronic Almanac, Contemporary Music Review, Body, Space & Technology Journal, Performance Paradigm Journal, Space and Culture: The International Journal of Social Spaces and The Extensions Journal of Embodied Technology)
- Give seminars and workshops to SARC researchers and the interested public
- Submit findings to, and attend international conferences (including ICMC: International Computer Music Conference, SIGGRAPH: International Conference on Computer Graphics and Interactive Techniques, NIME: International Conference on New Interfaces for Musical Expression and PSi: Performance Studies International)

Year 2 (continued):

- Organise an International Performance Conference entitled “*Two Thousand + SEVEN*” (already in conception stage; planned for May 2007 at the Sonorities Contemporary Music Festival/SARC, Belfast). This performance technology conference will feature invited speakers, presenters and concerts on the theme of networked performance environments, and will thus provide a valuable forum for discussing the research

Year 3:

- Stage one further performance with performers from CCRMA
- Produce two further international journal/conference papers
- Catalogue and annotate AV recordings of networked performances carried out in Year 2
- Produce a DVD of edited research material (AV material of performances, technical description of system design environment, findings of interviews, critical thoughts, etc.)
- Prepare the material for an online presence, which will include editing of sound and video material. The materials will be offered to appropriate digital archives, such as SARA (Sonic Arts Research Archive), University of East Anglia/Norwich and will be made available on the SARC server

Throughout the research I will maintain a personal online account of the work in progress (blog), allowing for daily feedback from the widest possible community. I already maintain a similar blog for feedback on my work as a performer and writer on performance issues.

My practical experience in web design, audio and video editing will facilitate the production of the materials.

Publication and Dissemination

The outcomes for this research will be:

- Seven networked real-time music performances
- Workshops/seminars for performers, the computer music community and the public
- Four theoretical and/or technical high quality international journal/conference papers
- The production of a DVD containing research materials
- Online presence of performances and of accompanying materials
- An international performance conference in 2007

All networked performances will be streamed from the SARC server.

Contribution to career development

If awarded, this Fellowship will give me the opportunity for working in an interdisciplinary research environment, currently not available to me. The ability to work within an outstanding research culture, such as found at the Sonic Arts Research Center in Belfast, would make this exciting research possible.

The Fellowship will allow for an adequate time scale to conduct thorough research in which testing, critical discussions with staff and students at SARC, and constant revision is given space. As an independent performer I rarely have the opportunity to combine practice-based work with theoretical investigation.

And finally, the research will inform and shape my future output as performer of contemporary music, and will allow me to create further practice-led research in the creative and performing arts.

Contribution to the institution's research environment and culture

My work will provide practical insights of a performing musician, which will create a new resource for staff and students, currently not available at SARC.

My background as a practitioner will aid in fostering a rich research platform where an exchange between performers and the computer music community can take place.

The interdisciplinary nature of my work combined with my practice-led background will facilitate the creation of a research environment in which a mutual working understanding of artistic and technology-informed practice can occur and enrich our understanding of culture and creativity at the intersection between those two practices.

In particular, as my approach to conceptualising and designing performance environments derives from a different type of practice, I believe that I am able to well complement the institution's research culture.

I will be based mainly at the Sonic Arts Research Center (for instrumental practice, technical developments, seminars/workshops, etc.).

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