EDITORIAL

Without performance, music simply does not exist. It may be symbols on a page, it may be bits etched in plastic, it may be an insistent tug at the imagination, but without performance music is not sound. If it does not enter through our ears, music is a mere novelty, an intellectual exercise, a trick of potential energy that is never made kinetic. Music is not text – its secrets are not revealed through a language that can be fully discerned by a diligent reader. Music is not pictorial – contemplating its representation yields meaningful detail, but stepping back does not synthesise the whole. Music is not an artifact – its true form cannot be touched, it cannot be grasped, it cannot be preserved in stasis. The significance of music depends on our sensory interpretation, perceptual transformation of physical to virtual, a collective illusion bonding perturbations in the air to intimations of beauty. Ultimately, music is nothing more or less than an experience, a temporal environment with a beginning and an end. In between those twin poles of silence lies performance.

This issue is the second in a series of collaborations between *Organised Sound* and the International Computer Music Association (ICMA). The ICMA is one of the few organisations to integrate research, composition and performance – the crucial components of advancing both the art and science of computer music. The annual ICMC conference, bringing together exceptional practitioners in these disciplines to share their work and inspiration, aims to epitomise this synergistic ideal. While most researchers and composers are trained to present their ideas to the community through papers and scores, articles exploring the issues of performance are uncommon. As a result, journals and other publications in the field focus primarily on development of new tools, analytical methods, and compositional techniques. Meanwhile, the knowledge of experienced performers, an equally important resource in the evolution of computer music, remains largely undocumented in the literature. Ideally, the expertise and insight of performers informs the practice of research and composition, and vice versa, creating a constructive feedback loop. In the process of translating concepts of sound from composer to audience, performance is essential to the practice of music as a living art, complicated by the unique challenges in interpretation and re-creation posed by the technologies of computer music. In this issue we have brought together articles from a variety of viewpoints, formally addressing some of these less-explored areas, yielding important perspectives on the risks and rewards of performing with technology.

Although performance embodies the heart of musical endeavour, it is not easily defined. There are as many modes of performance as there are types of music. Until late in the nineteenth century, performing required humans and acoustic instruments, either extrinsic (e.g. violin) or intrinsic (e.g. voice). In that era, it is likely that all the trappings of the musical world – scores, scholarship, and public opinion – revolved implicitly and explicitly around music as a participatory activity. It was possible to absorb music as a passive listener, but the source was always another person, with the attendant sociocultural dimensions in the air as well. In the early twentieth century, recording and reproduction technology began to seriously impact this anthropocentric dynamic, while composers experimented with sound generation using electro-mechanical means. In 'Free music and the discipline of sound', Lonce Wyse describes this evolution from specifically 'musical' instruments and relationships towards an expanded timbral palette encompassing all sound, made possible, yet still circumscribed by, advancing technology. Wyse discusses the visionaries who have contributed to the importation of new sonic material into the musical lexicon, and explores the continuing limitations to composers' application and audience acceptance of a truly egalitarian soundspace. Marc Battier also offers a historical perspective on the philosophies and applications of sound, in 'A Constructivist approach to the analysis of electronic music and audio art – between instruments and *Faktura*'. Battier weaves plentiful quotations and ideas from important composers and thinkers into a fabric of musical discourse, revealing interesting undercurrents at work in the interplay of aesthetics, technology and culture.

As the twentieth century progressed, technology facilitated the development of entirely new ways of

performing. New instruments and new interfaces, from the trivially simple to the forbiddingly complex, populated the musical landscape, transforming the personal and social experience of music in the process. Substituting loudspeakers for humans dramatically altered traditional composer/performer/audience relationships, as the role of expert performers often diminished due to the pursuit of ever more 'perfect' reproduction and simple economic factors. The totality of live performance became the mere act of pushing 'play' on a machine, yet still resulting in an enveloping rapture of sound. In the personal environment, the possibility of hearing the best musicians in the world at one's own leisure represented an obvious improvement. Some composers embraced the new territory, such as Cage and Hiller with *HPSCHD*, in which listeners are instructed on how to manipulate their stereo system during playback of the piece. Audience and performer became one. This shift could also be seen as empowering the composer to be a virtuosic performer of the studio, crafting every nuance in advance for a virtual audience, reaching out with fingers of sound across time and space. In the concert hall, however, where art and entertainment blend in observing the exquisitely skilled coordination of musicians on stage, the lack of visual reference and stimulation, not to mention the absence of variation between performances, led to more equivocal results. The practice of diffusion, in which pre-recorded material is panned amongst multiple speakers in real time – a potential virtuoso performance at the mixing board – emerged to restore some of what was lost in the transition.

In 'The creation and projection of ambiophonic and geometrical sonic spaces', Theodoros Lotis examines the role of spatialisation and the ways in which electroacoustic space can be composed with the degree of complexity and control associated with other aspects of orchestration. Lotis uses the piece *Base Metals* by Denis Smalley to illustrate such concepts as spatial articulation, spectral appearance, and frequency shaping, elements of spatial projection which contribute to the essential performance character and reception of an electroacoustic work. Agostino Di Scipio, in 'Sound is the interface', presents a system in which architectural space itself becomes a participant in the realisation of interactive music. By designing a performance as an ecosystem in which performer and environment recursively influence each other, Di Scipio advances the notion of interactivity not as action and reaction, but as the emergent properties of a nonlinear cybernetic hybrid converging towards and diverging from equilibrium. The capacity to interactively manipulate musical space naturally extends to composing visual space as well. In 'Spiral fiction', Julie Wilson-Bokowiec and Mark Bokowiec delve into their experiences creating and controlling intermedia

performances based on physical sensing by way of the Bodycoder system. Using the title work as a point of departure, the authors discuss the parametric mapping of movement to sound and video, the burden on performers of adapting to a multi-dimensional instrument, and the adaptations required on the part of an audience to receive the work as intended. As composers and performers exert further influence over localised sensory realities by interconnecting synaesthetic phenomena, the collaborative boundaries between creators, participants and audience will continue to blur.

At the core of these re-evaluations of the nature of performance are all the technologies that make autonomous sound possible. Public installations and concerts in which audience members shape the music that they hear in real time are not unusual. While such works might seem to be limited by the musical skills of an untrained audience, real virtuosity still lies in constructing the boundaries that define a coherent and compelling range of possibilities, essentially the qualities of a finely crafted instrument. As engaging as direct exploration of a composed sound world can be, virtuosic performers continue to play a crucial role in the realisation and advancement of electroacoustic music. A gifted performer has a sophisticated understanding of how to communicate with an audience, often translating compositional intentions more effectively than the composer could imagine. In order to do so, these performers must master not only their acoustic instruments, but the technology they interface with as well. To establish and build upon these foundations of excellence, there must be a tradition passed from one performer to the next. Mari Kimura, in 'Creative process and performance practice of interactive computer music', attempts to bridge the divide between acoustic and electronic realms, maintaining the grace and immediacy of the former while utilising the infinite malleability of the latter. From unobtrusive means to determine the status of the computer system during performance, to issues of machine musicianship, and ways to optimise rapport with an audience, Kimura addresses many of the practical obstacles she has faced so far in her career. Her insights provide essential wisdom for all electroacoustic musicians to internalise. In 'Performing electroacoustic music: a wider view of interactivity', Elizabeth McNutt also grapples with the particular issues faced by classically trained instrumentalists in the integration, personification, interaction and presentation of technology-based works. McNutt re-examines the composer–performer relationship as machines and technologists necessarily become equal partners in collaboration. She draws from her deep knowledge of well-known pieces in the repertoire to illuminate the numerous challenges regularly encountered in interactive performance, and possible solutions to improving the experience for everyone involved. Brian Belet, in

'Live performance interaction for humans and machines in the early twenty-first century', explores the terrain of interactive performance from the composer's point of view. Belet describes in detail the work of embedding the Kyma DSP system into his technical and aesthetic framework of composing for and with performers. He clearly conveys the complementary balance between composition and programming necessary for achieving his musical goals. As with Kimura and McNutt, Belet also emphasises the value of dialogue to successful realisation of live electroacoustic music.

It may come as a surprise that the best approach to harnessing technology in all its protean elusiveness is basic human communication. Ideally, a performer should not need direct access to a composer in order to properly understand, interpret, and deliver a piece, but we seem to currently lack a sufficiently robust musicology of computer music for that to be realistic in all cases. The more ominous corollary is that once access to these composers is no longer possible, the longevity of their work becomes seriously threatened. At that point, documentary recordings archive the definitive versions of the work, in essence becoming the work itself. While some may regard recorded material as relatively lifeless, others view it as an opportunity for resurrection and recombination. 'On the process and aesthetics of sampling in electronic music production', by Tara Rodgers, puts forth sampling in all its manifestations as a creative form equivalent to composing with raw materials. In effect, recomposing sampled sounds approaches a static recording as a dynamic instrument, full of potential for manipulation, deconstruction and recontextualisation. Traditionally, music has maintained timelessness through reinterpretation by performers in each new generation, offering fresh perspectives on centuries-old pieces. In an era when recording is fast becoming the *de facto* authoritative reference medium – for better and worse – sampling can be seen as one way to carry forward the interpretive tradition, crafting new work literally from bits of the old.

Another possibility is to dispense with the conventional concerns of authority and recording altogether, reinventing the sound and the instrument itself at every moment. In 'Live coding in laptop performance', Nick Collins, Alex McLean, Julian Rohrhuber and Adrian Ward describe this phenomenon. Treating programming code simultaneously as language, notation, instrument and processing, live coding takes the expression of performance to its logical extreme, composing in real time not only rhythms and timbres, but also the generative source of the sonic elements in parallel improvisation. In spirit this hearkens back to the age of analogue synthesizers, substituting transformations on screen for functional modification by way of patch cables. However, shifting from the physical limits of hardware to the virtual limitlessness of software is not just a change of interface. By almost entirely transferring the live performance of sound from the realm of the body to the realm of the intellect, live coding can be seen as an apotheosis of and reconnection to the process begun over a hundred years earlier. As the creative impulse instantly emerges into music, human performers are made more vital than ever, not replaced but augmented by machines and loudspeakers, liberated by the capacity to inhabit their imagination in sonic dialogue with a live audience.

For some time now, we have stood at the cusp of a new era, heralding the imminent arrival of responsive machines, technology that serves our musical dreams rather than bending us to its arbitrary shortcomings. The articles contained herein may be evolutionary or revolutionary – only time will tell – but at a minimum they reflect the state of the art where performance and technology currently intersect. They suggest many possible directions for future work, but what we know for certain is that hardware will get faster and software will grow increasingly complex. What we need, what we have needed all along and are still struggling towards, are machines that use their power to free us from repetitive drudgery, software that is designed to intuitively respond to our musicality, and interfaces that accurately translate between physical capabilities and artistic desires. These are the factors that will usher in the golden age of performing with technology. For now, we still adapt to our machines much more than they are adapted to us. Everyone already knows this, but it bears repeating because we still have a long way to go. What happens next depends on the skills, talents and creative vision of all who consider themselves musicians. The future awaits.

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