

used to exploit this emergence or 'becoming' in interactive media. After historically placing the 'composition-instrument' idea within the precursory musical traditions of experimental, improvisatory and generative music, Herber then looks at contemporary related works that show the potential of the composition-instrument in practice. At the time of writing, in 2007, Herber felt that the true blurring of composition and instrument had not been fully realised, but it is interesting to witness the arguable fruition of his research in the recent release of 'Bloom', an innovative music application for the iPhone and iPod Touch. Developed by ambient pioneer Brian Eno and software designer Peter Chilvers, 'Bloom' is described as 'part instrument, part composition and part artwork', allowing the user to create elaborate patterns and unique melodies by simply tapping the screen.<sup>1</sup> Eno's description of the application, that 'you can play it, and you can watch it play itself', closely parallels Herber's 'composition-instrument', and supports his research as efficiently keeping up to date with contemporary practice.

Part Four of the book focuses on 'Techniques and Technologies', emphasising the unpredictability of timings and interactions in video games, which means that unlike in film, where audio is mixed in post-production to the fixed image, mixing of audio for video games must happen interactively in real time.

Sound director Rob Bridgett opens the section with a short chapter on the pressing need for subtlety and silence in the mixing of video game sound. He shows how the competition of dialogue, music, and sound effects in a game results in heavily over-compressed sound and a subsequent lack of overall dynamic range. At a time when video games are becoming ever more cinematic, Bridgett proposes an awareness of dynamics, as well as interactive mixing and calibrating practices, as key steps towards the cinematizing of video game audio. To conclude, Bridgett proposes an interesting alternative for how to give gamers ultimate control over dynamics.

Composer and sound designer Leonard J. Paul follows this with an excellent chapter on what Collins outlined in her introduction as the main dilemma for games audio – its inherent repetitive nature. Paul's chapter is an introduction to granular synthesis in video games, with a convincing argument for using this method as a way of removing over-repetitiveness from game play. Although the method of sound granulation is complex, I found this chapter easy to grasp thanks to the writer's balance of specialist language and graphics with clear explanations. The method includes the idea that no sound effect is played back in the same way twice. The soundscape thus never becomes a recurring loop, countering the repetitive nature of sample-based playback in video games.

<sup>1</sup> Generative Music:  
<http://www.generative-music.com/index.html>  
Accessed 5 October 2009.

Karen Collins, *From Pac-Man to Pop Music* ♦ review by Denice McMahon

The tutorials at the end of the chapter support the writer's obvious passion for this new tool of granulation, and his desire for it to be used more widely.

With my limited technical prowess, I found the historical and theoretical perspective given in the book's final section an enjoyable conclusion to this thoroughly fascinating collection. Addressing the uses and users of games audio, the three chapters in this closing section explore the impact of audio on players, and how games audio can be used for alternative purposes.

My favourite chapter of the collection was Anders Carlsson's essay on chip music. As a fan of Carlsson's (aka Goto80) music, it was a pleasure to read about the history of the demoscene and of chip music itself by an experienced practitioner and composer of chip tunes. Carlsson's personal tone fits well with his account of the struggle faced by purist chip music composers in the age of digital file-sharing subcultures. His interest in chip music shows through the chapter as he recounts its development out of the demoscene, its relationship to other twentieth-century computer-based music, such as algorithmic music and *musique concrète*, and the ethical and copyright issues that arise for chip music composers.

Moving away from history towards a more analytical approach, Kristine Jorgensen's chapter offers an empirically-based study of the impact sound can have on the gaming experience. Similar to the use of commutation tests in academic analyses of film music, in which different music is substituted for what is already on the soundtrack and then the sequence is evaluated for the impact this change has on our perceptions, Jorgensen's sound-on/sound-off tests examine the effects of audio on game usability. Her research is important in showing that sound is not simply a decorative add-on in games but can be an essential channel of communication for vital game play information. Jorgensen's tests also emphasise the importance of sound in orienting the player, giving a sense of spatiality, which players seemed to lose when the audio was turned off. The extent of these effects, however, was shown to depend on the game's genre, with FPS (first-person shooter) games proving to be highly dependent on sound for both immersion and information.

In the final chapter of the book, entitled 'Music theory in music games', PhD student Peter Shultz asks what kind of skills are involved in rhythm-action, music-based video games, and if the systems of notation employed might be adapted for use in music education. By analysing the concepts and skills learned in games such as *Dance Dance Revolution*, *Guitar Hero*, and *Karaoke Revolution*, Shultz demonstrates how these games prompt players to develop skills which are ultimately related to traditional musical pursuits such as rhythmic dictation and reductive