Skin Music (2012): an Audio-Haptic Composition for Ears and Body

Lauren Hayes
Arts, Media and Engineering
Herberger Institute for Design and the Arts
Arizona State University
laurensarahhayes@gmail.com

ABSTRACT

Skin Music (2012) is a musical composition that is experienced as a private, multisensory installation by one person at a time. By lying on a piece of bespoke furniture, the listener perceives the music both through the usual auditory channels, as well as by different types of haptic sensation, through their body. The piece addresses the shared perceptual experiences of sonic and haptic sensation through an exploration of vibrational feedback.

Author Keywords
Haptics; composition; multimodality; vibrotactile feedback

ACM Classification Keywords
H.5.5 (Sound and Music Computing): Methodologies and techniques

INTRODUCTION

The link between sound and touch is inherent: hearing is, essentially, “a specialized form of touch” [2]. Profoundly deaf musician Evelyn Glennie asserts a view that is the grounding premise for this work. Her statement could be explained in physical terms by the fact that sound is the rapid vibration of molecules in the air, which excite the membranes, hair and fluid inside of our ears, allowing us to hear. Moreover, our perception of sound goes beyond just the penetration of the auditory canal, and in fact is felt by our whole body, through vibrations within the organs and the bones [8].

Over the last eight years I have explored the relationships between sound and touch by developing bespoke digital musical instruments (DMIs) using haptic technology [4]. My research has also examined the possible applications of vibrotactile technology in deepening the performer’s engagement with her instrument [3, 5], as well its ability to provide cues and aid communication during musical improvisation [6].

On furthering this research through the creation of numerous live electronic and electro-instrumental compositions, I discovered that not only was the vibrotactile technology useful during performances, but that it also allowed me to access multisensory information during the compositional process itself. I was able to experience the feel of a piece of music during its creation. This motivated me to explore how music might also be experienced physically by an audience.

AUDIO-HAPTIC COMPOSITION

Skin Music (2012) is an intimate work that explores the relationships between sound and physical sensation from the listener’s perspective. While a piece of music can touch us by arousing the emotions or triggering a memory, music also touches us physically, through vibrations in the air, which our ears perceive as sound, but which are felt, often subconsciously, by the entire body.

To experience Skin Music, the audience member is asked to lie on a chaise longue (see Figure 1). The piece begins and the music is transmitted through loudspeakers placed underneath the piece of furniture, and also through the listener’s body directly from the structure of the chair.

Technical Development

Six vibration motors were embedded in the chair (see Figure 2). By utilising the pulse-width modulation pins of an
Compositional Framework
The work draws on previous research by Chang and O’Sullivan [1] who use audio-visual theories, such as temporal linearisation, synchronisation, and masking in order to develop ways of linking the tactile and auditory sensations. I also implemented various arrangements of vibrotactile apparent movement [7]. This allowed me to create haptic trajectories, where a sensation could be perceived as moving, for example, up from the shoulders, to the neck and onto the head area.

Additionally, different frequency ranges within the audio were mapped to areas of the body. At certain points within the piece, lower pitched sounds will be felt lower on the body, and vice versa.

CONCLUSION
This potential new art form [3] falls within an area of composition that is largely unexplored and deserves more investigation, particularly in light of recent developments within the field of embodied music cognition. Skin Music was first exhibited at the Summerhall gallery, Edinburgh for six weeks of private view. Skin Music II is currently in development in collaboration with the school of Arts, Media and Engineering, Herberger Institute for Design and the Arts, Arizona State University.

REFERENCES