



Fig. 7 Sensors on the wrist: Stevie Wishart *The Sound of Gesture*

A future endeavor consists of the development of interfaces that accommodate the intuition and physical capabilities of the users, while at the same time allowing for nuanced musical results. The design and implementation of interfaces presents a very lengthy and complex undertaking, one which is influenced by traditional aspects as well as technical and solely human factors.

How long did it take to develop the technology necessary to change the size of an object by spreading two fingers, such as is possible with the iPhone? The development of such seemingly natural correspondencies requires much experience, intuition, and cutting-edge technical resources.

Other examples of advanced development can be seen in the artificial use of lasers: Through the use of laser light, dancers can produce sounds by touching the light beams, thereby translating their movement into sound and spatial position, as was done in the author's work *Shine* (Fig. 5). Another example of the use of cutting-edge developments can be seen in violinist Stevie Wishart's use of a controller to manipulate the electronics. Using sensors on their bow hand, the performers can communicate with the computer and continue to play the piece even though their bow is not touching the strings (Fig. 6). Todor Todoroff controls the computer using accelerometers and positioning sensors together with a theremin. Through the

simultaneous use of several controllers, he creates complex patterns of control data like those of Stevie Wishart. These data patterns allow the performer to achieve an intricate operation of the computer, thus enabling the generation of a vibrant sound and movement pattern (Fig. 7).

3. Conclusion

Kindled by the possibilities of digital control, and in parallel to the consumer domain, multichannel technology has especially made itself heard among composers of electroacoustic music. It is clearly evident that new approaches are being tried out, as well as being adapted for the normal concert setting. In addition to the Sound Dome, the traditional Acousmonium (Jaschinski 1999: 551) and wave field synthesis (Roads 1996: 252) must be mentioned here. The potential that is introduced to music through spatiality is only at the beginning of its development. The ability to consciously listen using space will continue to be developed in the future, and larger installations will become more flexible and more readily available overall. This will make it easier for composers and event organizers to animate and challenge the audience's capacity for experience. But composers will find more refined techniques and aesthetics in order to take advantage of the entire power of spatial distribution. If this happens the audience will follow, looking for new excitements in the perception of sound and music.

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About the author



Born and raised in Germany. Diploma in pedagogy in 1983. Between 1983-1989 composition studies with Nicolaus A. Huber and Dirk Reith at the Folkwang Hochschule Essen. Commission and collaboration with choreographer Susanne Linke for the choreography «Ruhrort», followed by

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Brümmer's work is focused on the relation between visuals and music, algorithmic composition and interactive interfaces.