

## **Rhythm In The Age of Digital Reproduction**

### **—micro-rhythmic relationships in computer based, groove oriented music**

#### **Final report**

During the past twenty years, the field of popular music has seen a remarkable increase in computer based, groove oriented music. In the present project we wanted to investigate some characteristic features in the sound of these styles in light of the new possibilities provided by developments in music technology in the same period. The project had a twofold objective. On the one hand it was aimed at exploring changes in rhythm and sound in the computer based, groove oriented music of the 1990s and gaining new insights into the rhythmic characteristics of computer-based groove oriented music. On the other, one aimed at increasing our understanding of the relation between contemporary popular music and digital music technology. A main question, therefore, was to what extent and in what ways changes in rhythm and sound in the computer based groove oriented music of the 1990s could be related to developments in digital music technology. A sub-goal was to establish a larger Norwegian milieu for research on rhythm and sound in groove oriented music at a high international level. Furthermore, one wished to consolidate the international resources and competence on humanistic research on rhythm and sound in groove oriented music, and to tie the research going on at the local level to an international network.

These objectives have been pursued along three paths. The first comprises musical-analytical investigations of the micro-rhythmic design of groove-based music with a focus on the interaction between sounding rhythmic events and various organizing principles of rhythm. We asked: what are the categories employed in our schematizing of sounding rhythmic events, and how are these categories shaped? Through close readings of technology-driven popular music genres, such as contemporary R&B, hip-hop, trip-hop, electro-pop, electronica, house and techno, as well as played folk music styles, prevailing theories of musical rhythm, which have until now mostly been derived from the study of Western art music, have been contested and revised. One focal point in this work has been to identify different ways of conceptualizing pulse and other reference structures of rhythm, and discuss their relevance for various groove-based musics (cf. Carlsen & Witek 2010, Chor 2010, Danielsen 2010a, Danielsen 2010b, Bøhler 2008). Many micro-rhythmic features typical of the songs that constitute the project's empirical material,

i.e. beats with considerable extension in time or multiple pulse locations at the micro-level, challenge the entire traditional notion of metric grids as a reliable reference for microrhythmic patterns. Instead of understanding pulse as an isochronous series of points in time, we suggest to conceive of each beat of the pulse as an extended ‘beat bin’ that may vary in size and shape, and to conceive of metrical salience as a gravitational force field within such a beat bin. The perceptual implications of such a musical-theoretical model of pulse has been worked out through linking it to psychological theories of dynamic attending and the role of entrainment processes in rhythm perception. (Danielsen forthcoming) Another key concept that has emerged from this research is the notion of *rhythmic tolerance*, (Johansson 2010a, Johansson 2010b), which explains the organization of time in music that are characterized by considerable variability in the lengths of their rhythmic units (measures and beats) within a constant, danceable tempo. A third concern has been the relationship between sound (pitch, sound intensity and timbre) and timing. One important finding here, which we want to pursue in further research, is that aspects of sound influence our experience of the timing of rhythmic events to a considerable degree, in fact to such an extent that aspects of sound are to be considered identifying features of rhythmic events (Bjerke 2010; Danielsen, Waadeland et al, forthcoming).

The second path concerns the relationship between contemporary popular music and its technological tools and focuses in particular on the impact of technological mediation on the sonic and microrhythmic design of contemporary groove-based music, given both the possibilities and the constraints of the relevant technological tools. In several studies comprising a variety of popular music genres (pop, electronic dance music, trip-hop, hip-hop), it was revealed how digital mediating technology (such as digital cut-and-paste techniques and sampling) often contributes significantly to the overall sound and feel of grooves (Danielsen 2008; Danielsen and Maasø 2009). In an MA study (which was later turned into a PHD project funded by UiO) the term *opaque mediation* was proposed to assist in framing the ways in which mediating techniques are exposed and made part of the artistic expression (Brøvig-Andersen 2007; Brøvig-Hanssen 2010). A related contribution concerns how the musical sampler is used to ‘decompose’ vocal tracks, transforming semantic meaning into abstract collages of sounds (Harkins 2010). A second focal point for our investigations of the impact of digital music technology has been the changing relationship between performing and composing in contemporary computer-based music-making (Kvifte 2010) as well as the extent to which

performance practice has changed as a result of, for example, quantized rhythms and machine time in popular music (Zagorski-Thomas 2010). Both the changing relationship between performing and composing in contemporary computer-based music-making and the discussions regarding the artistic impact of sampling and cut-and-paste, in short, the sonic imprints of digital music technology on artistic practice, will be pursued in future research. These themes are also relevant to ongoing discussions about changes in artistic authorship in the digital era, and are thus of considerable potential significance for societal considerations regarding copyright and ownership to artistic work, the latter understood as performances and/or the material results of artistic practices.

A third path of investigations concerns the embodied character of groove-based music and the impulse for movement this music is commonly assumed to contain. Here we asked: how is this bodily character of groove-based music conveyed? Moreover, how do dance and movement affect our experience and understanding of groove-based music in general, and computer-based grooves in particular? In a doctoral study of a particular rhythmic pattern commonly found in electronic dance music (the pountchak pattern), the link between stable repetitive structures in music and similar movement patterns is discussed. It is argued that grooves may contain an impulse for synchronized movement and, moreover, that the perceived verticality of the music may lead to expectations regarding the directions in such a synchronized movement (the actual down and up in the accompanying movements follow the perceived directions of down and up in the music). (Zeiner-Henriksen 2010b). Part of this work also addresses how the sound of a single rhythmic event may contribute to bodily movement in electronic dance music, drawing particular attention to the ways in which music production tools introduce pitch movements to bass drum sounds that in turn affect how we move to them. (Zeiner-Henriksen 2010a) In a different work, a case study of the British trip-hop artist/producer/composer Tricky, it is revealed how artists may also have an ambivalent approach to ‘dance-inducing’ aspects of their music. (Clarke 2010) Yet another contribution (Lacasse 2010) considers musical embodiment in the form of vocal expressivity through an analysis of ‘creaky voice’ in the Australian artist Sia’s song ‘Breathe Me’. It aims to clarify the role of microrhythmic and other paralinguistic features in the expressivity of a vocal performance, arguing that an expressive voice may dictate the premises for the overall rhythmic feel by establishing the framework within which all other rhythmic events are heard. As regards the

second question about how dance and movement affect our experience and understanding of groove-based music in general, and computer-based grooves in particular, Zeiner-Henriksen's doctoral study (Zeiner-Henriksen 2010b) also discusses how synchronized body movement may assist in focusing the important structural parts of the groove. However, much remains to be said about the mechanisms at work in this synchronizing process.

Methodologically, the project has developed path-breaking computer-assisted approaches to the analysis of sound and microrhythm. The project's main methodologies were drawn from a humanistic tradition, but the project has also received contributions from scholars based in more quantitatively oriented disciplines such as music theory and music psychology. The broad methodological scope of the project is documented in the anthology *Musical Rhythm in the Age of Digital Reproduction* (forthcoming in 2010 on Ashgate, edited by Anne Danielsen), which by means of its interdisciplinary design forms a compendium of the various ways in which musical rhythm can be approached. This book is based on contributions from the project group in Oslo and the international network for research on rhythm and sound in groove-oriented music that was established as part of the project.

One PHD student was funded by the project (Zeiner-Henriksen 2010b). The disputation will take place June 22, 2010. A second PhD student that was affiliated with (but not funded by) the project defended his thesis (Johansson 2010b) May 6, 2010. Four MA students have completed their theses as part of the project (Brøvig-Andersen 2007; Bjerke 2007; Carlsen 2007; Bøhler 2008).

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