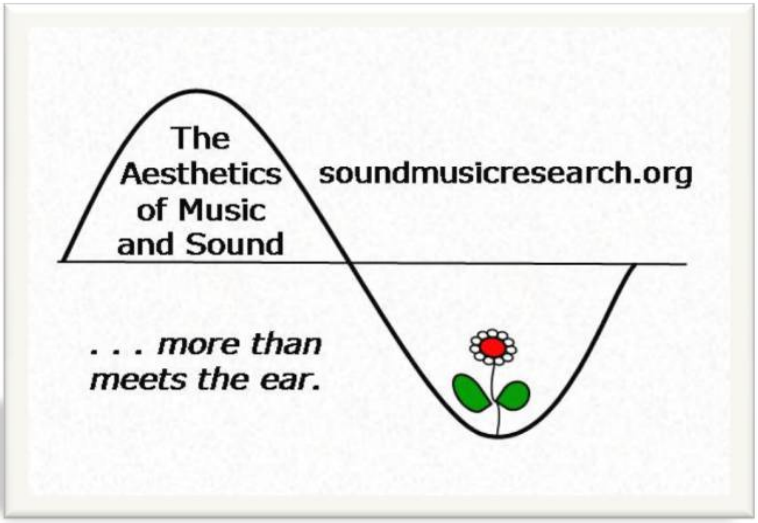

The University of Southern Denmark
Campusvej 55, Odense, Denmark

Thursday,
October 11, 2012
3:15-5 p.m. in U73

Guest lecture in the seminar series
Topics in the Aesthetics of Music and Sound

- arranged by **The Aesthetics of Music and Sound – www.soundmusicresearch.org – Cross-Disciplinary Interplay between the Humanities, Technology and Musical Practice**; Institute for the Study of Culture, University of Southern Denmark -

http://www.soundmusicresearch.org/seminarsfall2012.html

Elucidating the Significance of Statistical Learning in Music Cognition through Behavioural Experiments and Computational Modelling

Niels Chr. Hansen
Center of Functionally Integrative Neuroscience, Aarhus University Hospital; Centre for Digital Music, Queen Mary, University of London, United Kingdom;Royal Academy of Music Aarhus.

This presentation provides a general introduction to an on-going, EPSRC-funded research project on the Information Dynamics of Music (www.IDyOM.org). Since the launch of this interdisciplinary project in 2005, researchers at Queen Mary and Goldsmiths Colleges (University of London) have applied a wide range of methods spanning from behavioural experiments, computational modelling, musicological analysis and advanced neuroimaging to explore the relation between dynamic changes in the information-theoretic structure of music with cognitive and neural processes in the listener. The initial part of my talk will focus on the rationale behind the IDyOM project, briefly present the computational procedures which are typically used to model listener responses, and discuss some of the key findings thus far.

In the second part of the talk, I will delve more thoroughly into a recent IDyOM experiment which tested the cognitive validity of the information-theoretic concept of Shannon entropy as a model of predictive uncertainty in auditory cognition. This work was motivated by the proposal that schematic expectations arise from automatically internalised probabilities in our sensory input.

More specifically, 24 melodic contexts were selected from two repertoires differing in rhythmic and tonal complexity (i.e. *complex* Schubert songs and *simple* isochronous hymns). The contexts were assigned to low- and high-entropy categories according to predictions of an unsupervised, variable-order Markov model. Musicians and non-musicians listened to the stimuli and provided explicit judgements of perceived uncertainty (*explicit uncertainty*) and an implicit measure computed as the entropy of expectedness ratings obtained using a classical probe-tone paradigm (*implicit uncertainty*).

The findings from this experiment support the notion that domain-relevant training leads to an increasingly accurate cognitive model of probabilistic structure. Furthermore, the efficacy of entropy as a model of predictive uncertainty is enhanced by: (a) simplicity in sensory input, (b) domain-relevant training, and (c) implicitness of uncertainty assessment. It is argued that these factors facilitate the generation of more accurate perceptual expectations.

ALL ARE WELCOME!