

## Appendix A: Detailed Work Plan

### Using gestural information of the audio signal

In this working paper I present a STMS work plan for a stay with the Music Technology Area of the Schulich School of Music at McGill University. Dr. Gary Scavone will be the supervisor for this STSM at McGill University, with likely contributions from Dr. Philippe Depalle and Dr. Vincent Verfaillie as well.

The sounds made by music instruments contain intrinsic information about the control gestures used in their production. Parameter extraction methods applied to these sounds can be used to control sound synthesis [1,2] or sound processing [4] algorithms. It is the goal of this STSM to develop new ways of extracting and using this gestural information for sound synthesis. We will focus on two approaches to do this:

#### 1. Parameter extraction to generate control parameters:

- We will investigate a formal definition for the parameter “noisiness” and develop methods of tracking it.
- We will generate a list of gestures and corresponding parameter-relationships (using pitch, amplitude, spectral centroid, and noisiness) according to our experience as string and woodwind instrumentalists. This will be done to get a rough roadmap for the implementation of an intuitive mapping between extracted parameters of the audio signal and the input parameters of sound synthesis.

#### 2. Audio signal as primary "control parameter":

- We will modify known synthesis methods that use oscillators according to the method of Audio Signal Driven Sound Synthesis [3]. In this method, oscillators of synthesis algorithms are replaced by the audio signal of a music instrument. If necessary the sound result is indirectly modified by extracted parameters of the input audio signal. This method falls between sound synthesis and sound processing.
- With the resulting algorithms we will do a first personal subjective analysis of their input-gesture / output-sound equivalence.

These two approaches use different methods to achieve similar goals. We expect a variety of results from this work that should be of interest for further research projects in this field.

#### References:

- [1] Janer, J., Voice-Controlled Plucked Bass Guitar Through Two Synthesis Techniques, Proc. International Conference on New Interfaces for Musical Expression, Vancouver, Canada, 2005 p. 132 -135
- [2] Jehan, T., Schoner, B. An Audio Driven Perceptually Meaningfull Timbre Synthesizer, Proc. International Computer Music Conference, Havana, Cuba, 2001, p. 381- 388
- [3] Poepel, C., Dannenberg, R. Audio Signal Driven Sound Synthesis, Proc. International Computer Music Conference, Barcelona, Spain, 2005, p. 391 - 394
- [4] Verfaillie, V., Arfib, D. A-DAFX: Adaptive Digital Audio Effects, Proc. COST G-6 Conference on Digital Audio Effects, DAFX-01, Limerick, Ireland, 2001, p. 10 - 13