

Student Projects 2009

Real Time simulator of bimodal and hybrid hearing devices.

Supervisor: Dr Jeremy Marozeau

The project will result in the implementation of a bimodal hearing device simulator program. The simulator will take microphone or audio input, and process audio in real time, providing a simulation of how a listener with a cochlear implant (CI), hearing aid (HA), or hybrid device (CA+HA) in one or both ears may perceive sound. This simulator will run in real-time on a PC equipped with a microphone or line-in. It will be implemented in JAVA in the MAX/MSP environment. It will be highly parametric, letting the user easily change the mapping, the sound processing strategy and hearing-aid parameters. Any change will be effective in real time, letting the user fully appreciate the effect of each parameter change. The accuracy of the simulator will be evaluated by patients with unilateral losses (one ear with impaired hearing + one ear with normal hearing).

This simulator is useful for 3 main reasons:

- 1] In order to improve music perception, it is important to understand how the sound quality depends on physical parameters (pulse rate, number of channels ...).
- 2] Bimodal and hybrid stimulation is currently under investigation as a better approach to improve music appreciation. This simulator will be useful to evaluate this approach.
- 3] The music perception team is currently working with a composer to organise a concert with music made especially for people with impaired hearing. This simulator will be very beneficial for the composers, who will be able to test various compositions in real time.

Techniques that you will learn:

- Running Psychoacoustic experiments
- Sound editing and mixing
- Software as Max/MSP and Matlab
- Hearing impairment simulation
- Statistical analysis of data
- Recruitment Subjects
- Real time audio programming

This project area is suitable Honours, Engineering student Project and PhD Students

