

Removing cochlear implant artefacts from electrically evoked potentials.

A cochlear implant (CI) is a small electronic device that can help provide a sense of sound to a person who is profoundly deaf or severely hard-of-hearing. The CI consists of an external portion that sits behind the ear and a second portion that is surgically implanted within the impaired inner ear. The CI allows a hearing impaired individual to access speech information and environmental sounds; this usually improves the quality of speech production in deafened adults and gives young children the potential to develop spoken language.

There is a great need to develop robust objective tools to assess cochlear implant performance, especially in prelinguistic infants. One group of objective tools are electrically evoked potentials, where one of the electrodes in the CI array is used to inject current in the inner ear and stimulate an evoked potential in the auditory system. Unfortunately by stimulating the auditory system with an injected current and not with an acoustic stimulus, a strong stimulus artefact is also recorded that can mask the true evoked potential (Friesen and Picton, 2010).

This project will look at statistical signal processing methods (such as independent component analysis) to help solve this problem. In particular, the feasibility of using a single channel method over a multichannel approach (Jung et al. 2008) will be investigated.

A strong basis in engineering maths and statistics is recommended, as well as programming skills in MATLAB. This project will make use of existing EEG recordings from CI patients.