Cochlear Implant Fitting for Noisy Listening Conditions Using a Computational Model of Speech Perception by Cochlear Implant Users

Elad Sagi, PhD
1601 Carroll Street
Brooklyn, NY 11213
elad.sagi@nyumc.org

Principal Investigator: Elad Sagi, PhD
Public Contact: 718/778-2423; Fax: 212/263-7604

Project Number: H133F090031
Start Date: January 01, 2010
Length: 12 months
NIDRR Officer: Margaret Campbell, PhD
NIDRR Funding: FY 09 $65,000

Abstract: The aim of current Cochlear Implant (CI) research is to narrow down the search for CI fitting parameters which hold the greatest potential to improve an individual CI user’s speech understanding in noise by using a computational model of speech understanding. This project has two research objectives: (1) develop and test a model of CI users’ speech understanding in noise, and (2) assess model predictions of patient-specific CI device settings that hold greatest potential for improving speech understanding in noise. The first research objective involves modifying a pre-existing computational model of speech understanding by CI users in quiet to account for their speech understanding in noisy listening conditions. Twelve postlingually deafened adult CI users are tested for speech understanding in quiet and noise. The pre-existing model is applied to the data in quiet, and the proposed modifications are tested on the data in noise. The second research objective uses the model developed in the first objective to make predictions on speech understanding in noise, specific to each individual, as a function of up to 625 CI device setting manipulations. The four device settings that hold the greatest potential for improving speech understanding in noise are assessed on eight of the CI users that participated in the first research objective using speech testing in noise. The results are compared to each listener’s speech understanding in noise achieved with their clinically assigned device settings.