

## **Abstract EFAS/DGA 2007**

### **Electric stimulation of the human cochlea, cochlear nucleus and inferior colliculus: Implications for speech recognition**

Shannon, R.V. (1), Colletti, V. (2), Lenarz, M. (3), Lim, H. (3), Lenarz, T. (3)

(1) House Ear Institute, Los Angeles, CA, USA

(2) University of Verona Medical School, Verona, ITALY

(3) Medizinische Hochschule Hannover, Hannover, German

Cochlear implants are not useful for patients with no remaining auditory nerve, so prosthetic devices have been designed to stimulate the cochlear nucleus in the brainstem and the inferior colliculus in the midbrain, using both surface and penetrating electrodes. We will present psychophysical results and speech recognition results from surface and penetrating electrodes at the level of the cochlear nucleus and inferior colliculus. Surprisingly, psychophysical measures of temporal, spectral and intensity resolution are mostly similar across stimulation sites and electrode types. Speech recognition is excellent in cochlear implants and in some patients with stimulation of the cochlear nucleus, but not in patients who lost their auditory nerve from bilateral vestibular schwannomas (NF2). Quantitative comparison of results from electrical stimulation of the auditory system at different stages of neural processing, and across patients with different etiologies can provide insights into auditory processing mechanisms. An emerging hypothesis is that the normal auditory system contains a separate processing subsystem for speech patterns that is distinct as early in the system as the cochlear nucleus. Presumably, this subsystem is damaged during tumor removal.

