

## TECHNOLOGY OFFER

# HEARING (AID) TECHNOLOGY

We protect and  
market inventions.

## SIGNAL-DEPENDENT STIMULATION OF THE AUDI- TORY NERVE INSPIRED BY THE PHYSIOLOGY

Innovative signal processing for implanted hearing devices  
improves speech intelligibility (UoL161)

### THE PROBLEM

Implanted hearing devices restore hearing for people with partial or total hearing loss, provided their auditory nerve is still intact. The most popular example is the so-called cochlear implant that contains an arrangement of electrodes implanted into the cochlea. A microphone receives acoustic signals that are processed by a speech processor and transmitted to the electrodes as stimulating signals. The electrodes stimulate the auditory nerve using electric pulses, thus bypassing the function of the missing sensory hair cells in the cochlea.

The majority of known cochlear implants use a constant pulse rate at all electrodes of the electrode arrangement. The pulse rate of the single electrodes in the cochlear implant therefore does not allow for a differentiation of sounds, as is common experience for people with normal hearing abilities, for example, when distinguishing voices from background noise.

### THE SOLUTION

As part of the excellence cluster "Hearing4all", the research team "Models for hearing devices" at the University of Oldenburg developed a signal processing strategy for implantable hearing systems in order to enable improved speech intelligibility. The invention is based on the fact that the auditory nerve encodes voiced sounds, e.g. vowels, different to unvoiced sounds, by so-called rate encoding. To mimic this, the invention selects the pulse frequency and the electrodes to be stimulated for voiced sounds differently than for unvoiced sounds, which means flexibly and signal-dependent. The idea was inspired by physiological studies of the normal auditory systems. In first trials, the inventors discovered that cochlear implant users were able to understand vowels better with this new coding strategy.

A further development of the invention is desired, for example, in form of cooperation with a manufacturer of cochlear implants and in the excellence cluster "Hearing4all".

### ADVANCES AND APPLICATIONS

The improved perception of voiced sounds leads to better speech intelligibility.

The invention has been initially developed for cochlear implants; however, it may also be applicable to other types of implanted hearing devices, for example, brain-stem implants.

### FIELD OF APPLICATION

Implanted hearing systems

### KEYWORDS

Frequency-specific stimulation rates,  
flexible variation of electrode alloca-  
tion, natural hearing

### PROPERTY RIGHTS

DE 10 2016 214745.5  
registered

### OFFER

Licensing, sales, cooperation and  
further development

### AN INVENTION OF

Carl von Ossietzky University Olden-  
burg, Germany and Cluster of Excel-  
lence "Hearing4all"



InnoWi GmbH  
Fahrenheitstraße 1  
28359 Bremen  
Germany  
Tel.: 0421- 96 00 7 - 0  
mail@innowi.de  
www.innowi.de