

Hearing the words beneath the noise

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Hearing aids and cochlear implants act as tiny amplifiers so the deaf and hard-of-hearing can make sense of voices and music. Unfortunately, these devices also amplify background sound, so they're less effective in a noisy environment like a busy workplace or café.

But help is on the way. Prof. Miriam Furst-Yust of Tel Aviv University's School of Electrical Engineering has developed a new software application named "Clearcall" for cochlear implants and hearing aids which improves speech recognition for the hard-of-hearing by up to 50%.

"Hearing-impaired people have a real problem understanding speech," says Prof. Furst-Yust. "Their devices may be useful in a quiet room, but once the background noise levels ramp up, the devices become less useful. Our algorithm helps filter out irrelevant noise so they can better understand the voices of their friends and family."

Based on a cochlear model that she devised, the new patented technology is now being developed to improve the capabilities of existing [cochlear implants](#) and digital hearing aids. Adding Clearcall to current technology is quite straightforward, says Prof. Furst-Yust, and requires only add-on software for existing devices.

Better hearing through math

"We've developed a mathematical model of the ear that shows how speech recognition works. The math is complicated, but basically we're

cleaning auditory information before it goes to the brain. We get rid of some of the information — the background noise — so that the hearing-impaired have an easier time 'filling in' missing information that their ears can't give them," explains Prof. Furst-Yust.

The software was originally developed for use in cell phones, but Clearcall introduced distortions that people with healthy hearing found distracting. That's when Prof. Furst-Yust started applying the methodology to hearing aids.

"It takes some getting used to," she notes, "but people who have been wearing [hearing aids](#) all their lives have no problem getting the most from Clearcall. And we can train the newly hearing impaired in a quick introductory session."

A rap on sound pollution

Clearcall works with the brain's own sound recognition faculties to help the hearing aid wearer filter out [background noise](#). To a person with normal hearing, a Clearcall-filtered voice will sound distorted, the same way it's hard for some people to recognize voices and words over the telephone. And even to the newly hearing impaired, Clearcall will sound different. But with continued use, the software improves the clarity of voices from 30 to 50%. Prof. Furst-Yust is currently preparing the results of her study for publication. It is based on people with only 20% of their hearing intact.

Available for licensing through Tel Aviv University's commercialization company, Ramot, the software could become part of an existing implant or device in a matter of months once the right strategic partner is found.

Prof. Furst-Yust continues to refine her algorithm for future applications and foresees the invention of an ultimate device for filtering out the

things normal hearers don't want to hear, like the boombox next to us on the subway. She believes it will be easier to target music than voices, since our brains are trained to already listen to music differently.

Source: Tel Aviv University ([news](#) : [web](#))

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