UCI cognitive scientist studies how background noise helps and hinders hearing

Findings will help explain how we separate and hear sounds in an acoustically cluttered world

Honing in on a particular conversation in a noisy restaurant can be quite a challenge as myriad background noises vie for your listening attention. For those with hearing impairments, the continuous stream of commotion from conversational chatter and dining ware clatter can be overwhelming, making the ability to hear a singular conversation next to impossible, even with help from assistive technology.

"Our ability to hear and pick up on different sounds is a very complex process," says Virginia Richards, a cognitive scientist and hearing specialist in UCI's School of Social Sciences. "This is because the sounds combine together before they enter the ear, making it difficult to separate out energy from different sources."

Richards has studied the complexities of the human hearing process for the past 20 years, the first 19 as a professor at the University of Pennsylvania before she joined the UCI faculty in January of this year. Her research on how sound sources affect one another have been published widely in top hearing journals such as the Journal of the Acoustical Society of American, and is the type of basic science level research that is useful in advancing hearing aid technology.

With a newly awarded $192,000 grant from the National Institutes of Health, she is conducting a study on how certain background noises may improve a person's ability to detect new sounds in a noisy environment.

Using the method of free response, she will ask participants to listen to a stream of "noise" containing intermittent tones. Each time a target tone is played, participants will tap a button indicating that they have heard the intended tone. Richards will then analyze the data to learn what constants occurred across the thousands of trials in the noise played milliseconds before the target tone that may have impacted a person's ability to detect the sound.

"For some listeners the target tone is easier to hear when it is embedded in a continuous noise rather than when the noise and target are played together," she says. Gaining a further understanding of how background noises help the ear detect changes in sounds may be helpful in the development of new technology that works with – instead of tuning out – these important changes in the environment.

Richards' study began in September and will run through August 2011.

To learn more about hearing research at UCI, visit http://www.socsci.uci.edu/Hearlab/index.shtml.