

Audiologists help set the stage for better theater sound experience

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From left: Drs. Carol Cokely and Linda Thibodeau of the Callier Center for Communication Disorders worked with Barry Epstein to create the Hear Us Now program. Epstein is a Dallas Summer Musicals executive board member in charge of the program.

As the lights dim, a low rumble can be heard advancing from the front of the theater to the back as the powerful bass speakers kick on.

Theaters tune their sound systems to be physically felt by theatergoers to draw them into the experience, but for individuals with hearing loss this can be more alienating than inclusive.

For Dallas Summer Musicals, this meant creating a new listening experience with some innovative thinking and an unusual combination of theater technicians, electrical engineers and two UT Dallas audiologists.

Drs. Carol Cokely and Linda Thibodeau of the Callier Center for Communication Disorders collaborated with DSM to create the Hear Us Now program, which uses five different technologies to provide a wide range of options for accessing the theater's sound system outside of its normal speakers. Most theaters offer one point of access for those with hearing impairments via a headset.

"A longtime season-ticket holder said to me, 'You know I've been coming here for years, and I get the standard headset and I really can't understand much on them. I look around and when it's time to clap, I clap, and if I see people laughing, I laugh.' It really helped make me aware of the plight of those with severe hearing impairments," said Barry Epstein, a DSM executive board member and electrical engineer in charge of the Hear Us Now program.

"I started asking around, because our equipment was as good as anybody's. I found hearing assistance is at the end of the food chain. The industry doesn't think much about it."

According to Epstein, theater sound systems strengthen the lower frequencies in bass to make the listeners feel like a part of the show.

Most hearing loss begins in the higher frequencies where speech occurs. While it does not cause a problem for most theatergoers, emphasizing the lower frequencies may make speech or singing even harder to hear for those with hearing loss.

"Because of the physical attributes of the cochlea, low frequency sounds cause some excitation along the entire range of sensory processing where as high frequency sounds typically stimulate a more prescribed region," said Thibodeau, professor in the School of Behavioral and Brain Sciences (BBS). "When a person with hearing loss receives an abundance of low frequency information, there can be more interference with processing high frequency information, which is critical for speech understanding."

To counteract this problem, Epstein created a method to dampen the music while emphasizing voices and to conduct syllable-by-syllable volume corrections using electronics and improved headsets. The team also implemented four methods for connecting to hearing assistive devices: a thin silhouette device and receiver that communicate with a T-coil, a receiver that connects to personal streaming devices, and frequency and digitally modulated-compatible seating areas.

"The characteristics of hearing loss and what works best for those who have hearing loss has tremendous variability. There is not a one-size-fits-all kind of arrangement," said Cokely, clinical associate professor in BBS. "Many individuals have a T-coil in their hearing aid and others do not. Some individuals use remote microphone technology, like an FM system, and others do not. If we're going to provide access to individuals who have hearing loss, we have to be able to meet the wide array of their needs and how they approach management of their hearing loss."

DSM is working with local school districts to allow students to bring their school-issued FM receivers to performances. FM receivers attach

to a hearing assistive device and work much the same way as a car antenna receiving a signal from a radio tower. Teachers speak into a microphone that broadcasts to any of the receivers in the class, but the receiver can be reconfigured to the theater. DSM tested its FM system last spring with great success, treating students from local school districts to the musical *The Little Mermaid*.

Highland Park High School senior Bailey Turfitt, who has severe [hearing loss](#) in both of her ears, said she loves theater and music. She normally uses high-powered hearing aids with a digitally modulated system to hear in everyday situations. When she connected to DSM's system at a special event, Turfitt heard the theater sound system in ways she never imagined.

"When I turn it off, I can kind of hear the music in the background, but when I turn it on, it's clear, it's crisp," she said. "I have seen shows here before, and I had the trouble of not being able to understand anything. I would enjoy what I was seeing, but I wouldn't be able to hear anything. With this, it just changes it completely—I can hear everything. It's clear, it's amazing."

Thibodeau, Cokely and Epstein are hopeful these improvements will allow people with [hearing impairments](#) to fully enjoy performances, not just in Dallas, but everywhere as other theaters adopt the Hear Us Now program.

Provided by University of Texas at Dallas

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