Electrical engineering professor's research finds more space on cell phone spectrum

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A UT Arlington electrical engineering professor is developing a system in a cell phone could automatically locate available space within a bandwidth, reducing or eliminating "dead spots" in coverage.

Qilian Liang, the electrical engineering professor, received a three-year, $470,000 National Science Foundation grant that creates and implements a plan that researches spectrum-sharing technologies.

"In the wireless network industry, bandwidth is everything," said Liang, who has been at UT Arlington since 2002. "The system I'm developing shows where the room is in a bandwidth."

Liang said most wireless network and bandwidth researchers believed that space was nearly all allocated.

However, if a system more specifically directs a signal to travel to where there is space, users can experience quicker response time as well as fewer or no dead spots.

Liang said one example might be Cowboys Stadium in Arlington, where dropped cell phone calls or no cell phone service happens frequently.

"The system we're developing would tell a cell phone signal where to go on the bandwidth spectrum," Liang said. "We've discovered that only a portion of the spectrum is being used. If you tell the signal where to go, that person can get service and the spectrum is then able to

accommodate more users."

Liang compared his research to a highway that could contain more cars at a faster speed.

He said the cell phone network providers like AT&T or Verizon could program their phones to try one part of the spectrum, then another, then another. Jean-Pierre Bardet, dean of the UT Arlington College of Engineering, said Liang's work has the ability to save cell phone users time and money.

"The system also has the chance to save cell phone companies time and money, and provide better service. Who hasn't experienced dropped calls?" Bardet said. "Cell phones and the wireless spectrum have become so much a part of who we are. The research has a chance to change how cell phones operate."

The co-principal investigators of this project are Jie Wang from University of Massachusetts and Hyeong-Ah Choi from George Washington University.

Liang's grant is part of an initiative that started when President Obama issued a memorandum in 2010, titled, "Unleashing the Wireless Broadband Revolution." The president's charge was to identify 500 megahurtz of spectrum to be made available for wireless broadband use.

Congress followed that memorandum with a directive to the Federal Communications Commission to devise a plan "to ensure that all people of the United States have access to broadband capability." The resulting National Broadband Plan was released in 2010 and, among many other recommendations, calls on the NSF to fund wireless research and development that will advance the science of spectrum access.

"We want to continue work in this area," Liang said. "We believe the opportunity for funding in this area will continue because of the popularity of wireless devices and the need for increasing bandwidth space and utilization."

Provided by University of Texas at Arlington