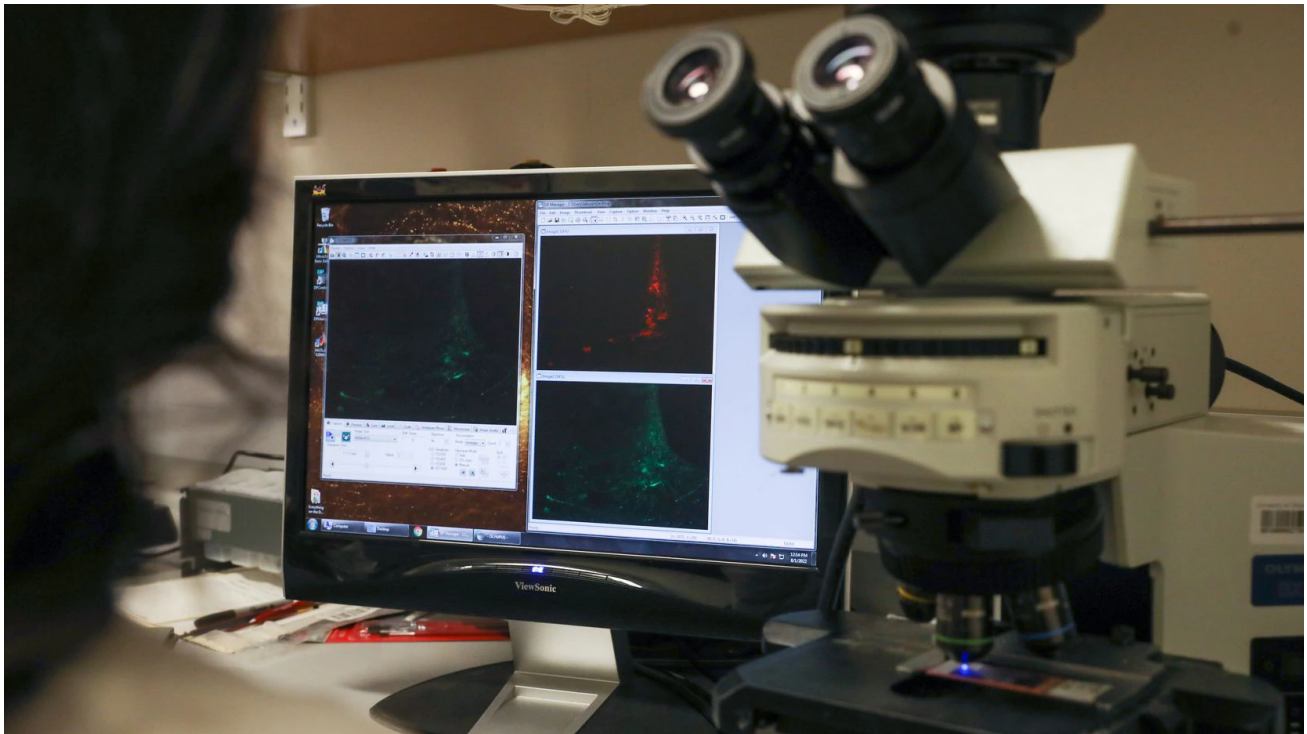




## NEWS

## UT Dallas researchers explore treatment to improve PTSD recovery

Vagus nerve stimulation may increase the effectiveness of traditional PTSD treatments



Debora Calderon, research assistant and fourth-year doctoral student at The University of Texas at Dallas, looks for the presence of a virus after infecting thin slices of rat brain at a lab on campus on Monday, Aug. 1, 2022. Her work with immunohistochemistry is used in co-principle investigators, Christa McIntyre's, associate professor at The University of Texas at Dallas, and Catherine Thorn's, assistant professor at UTD, vagus nerve stimulation research. (Liesbeth Powers / Staff Photographer)

By [Jessica Rodriguez](#)

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Two research groups at the University of Texas at Dallas are exploring a treatment that could improve the recovery of people experiencing post-traumatic stress disorder, or PTSD.

Vagus nerve stimulation, or VNS, used with traditional treatments for PTSD, may help shorten the length of treatment, increase its effectiveness and make the process more tolerable for patients.

The UTD groups are investigating two key research areas. One group is exploring the complex mechanisms that will help scientists understand how and why this treatment works, as the other group runs a clinical trial testing the use of a new device that can deliver the treatment.

For those who experience PTSD, improved recovery can be life-changing, said Robert Rennaker, associate director and distinguished chair at UTD's Texas Biomedical Device Center.

**Related:** [These 2 Dallas agencies helped a vet with PTSD](#)

The vagus nerve (or a set of vagal nerves) makes up the bulk of our body's parasympathetic nervous system – also known as our “rest and digest” system. Vagal nerves on the left and right sides of our body run from our brain to our large intestine, and they carry a wide range of signals between different organs and systems, including our brain.



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They play key roles in functions like digestion, breathing, sensation and memory.

For example, when we are in a high-stress situation, the vagus nerve tells our brain: “This is an important event. Store this memory so you don’t keep putting yourself in the same dangerous situation over and over again,” said Christa McIntyre, an associate professor at UTD and leading researcher in emotional modulation of memory storage.

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Co-Principle Investigators, Christa McIntyre (left), associate professor at The University of Texas at Dallas, and Catherine Thorn, assistant professor at UTD, stand in their lab on campus on Monday, Aug. 1, 2022. They are recent recipients of a \$2.2 million grant from the National Institute of Mental Health and are hoping to demonstrate how vagus nerve stimulation can accelerate recovery in tandem with therapy for patients with traumatic memory issues. (Liesbeth Powers / Staff Photographer)

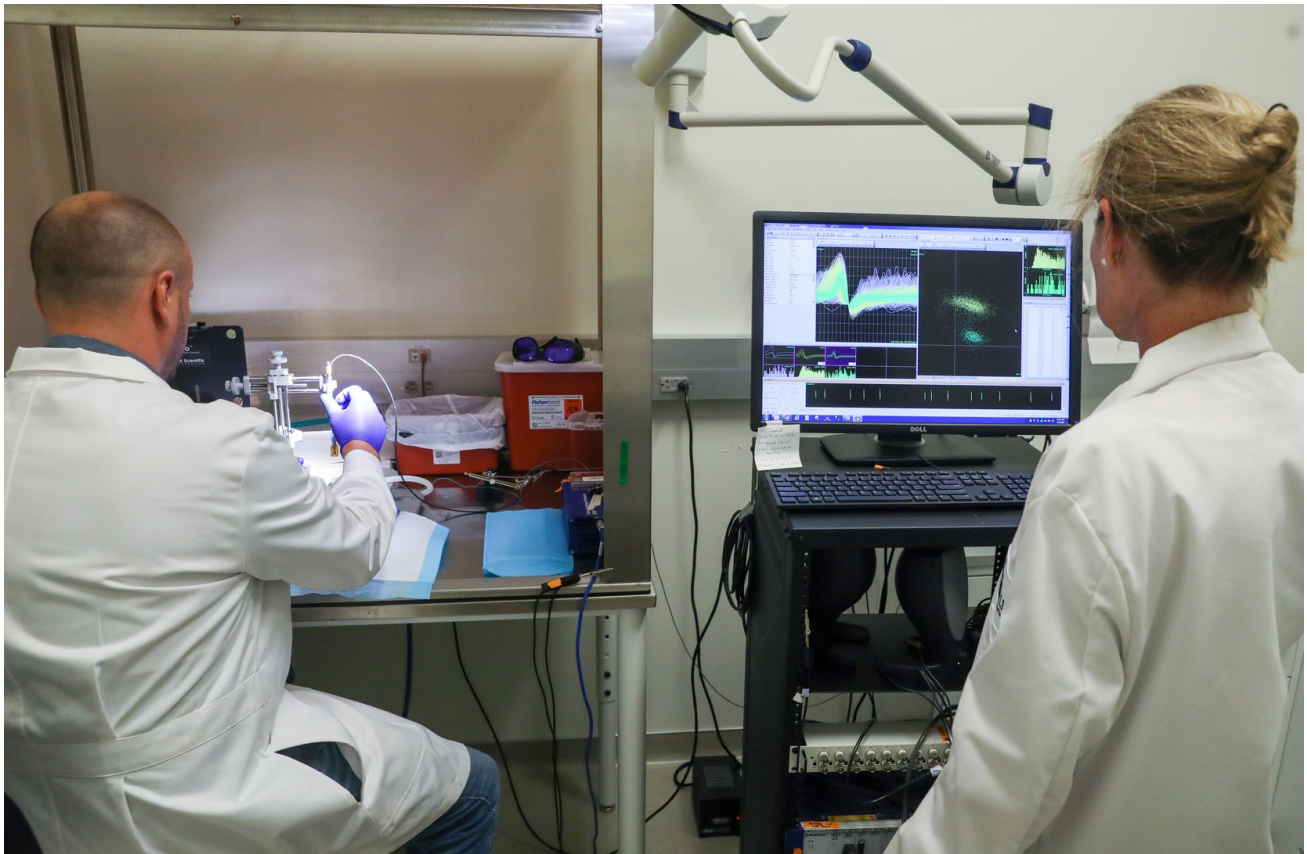
McIntyre is the principal investigator of a new [\\$2.2 million grant](#) from the National Institute of Mental Health aimed at understanding the mechanisms that make VNS useful in enhancing treatments that help patients with the maladaptive, intrusive and enduring memories that can come from emotionally traumatic experiences.

When we experience a traumatic or emotional event, said McIntyre, our memory of that event lasts a long time. This means that we may be fearful of any reminders of the threatening event even after it happens. Over time, however, a process called “fear extinction” allows us to create new memories that compete with the old ones.



trauma. But that process doesn't always work perfectly.

“People who have PTSD, unfortunately, show an impairment in their ability to extinguish conditioned fears, and that might be why they develop PTSD in the first place,” said McIntyre.



Principle Investigator Christa McIntyre (right) looks at a monitoring screen for live vagus nerve testing while research scientist Rimenez Rodrigues de Souza breaks down the stimulator used for the testing at a lab on The University of Texas at Dallas campus on Monday, Aug. 1, 2022. Rodriguez, associate professor at UTD, and her co-principle investigator Catherine Thorn, assistant professor at UTD, are recent recipients of a \$2.2 million grant from the National Institute of Mental Health and are hoping to demonstrate how vagus nerve stimulation can accelerate recovery in tandem with therapy for patients with traumatic memory issues. (Liesbeth Powers / Staff Photographer)

A standard treatment for PTSD called exposure therapy involves being repeatedly exposed to the reminders of trauma in an effort to extinguish the conditioned fears. But one of the challenges of this therapy is the rate at which patients drop out, since one of the symptoms of PTSD is avoidance of trauma reminders.



brakes on our fight or flight response, or acting as a “vagal brake.”

Scientists believe that the vagus nerve may be stimulated by adrenaline during stressful situations, making those memories long-lasting.

By electrically stimulating the vagus nerve through VNS, researchers may be able to achieve the same memory- enhancing outcome while bypassing patients’ fight or flight response.

This would mean potentially being able to make the memories that are made in exposure therapy just as strong and long-lasting as the trauma memory, without patients experiencing the physical changes to their bodies that come with fight or flight, said McIntyre.

That is the goal of their research.

But how does this nerve stimulation actually get administered safely? This is one of the questions that Rennaker and his colleagues are working to answer through their clinical trial.



Robert Rennaker, professor of neuroscience at The University of Texas at Dallas, holds a phone that connects to the new Vagus Nerve Stimulator (center) through a system called ReThink and a Power and Communication Module (right) in the Bioengineering and Sciences Building on campus on Monday, Aug. 1, 2022. Rennaker is doing clinical trials for the Vagus Nerve Stimulator for quicker recovery from injury, including PTSD. (Liesbeth Powers / Staff Photographer)

In any given year, about [12 million adults](#) in the U.S. will experience PTSD. The lifetime occurrence is about 6%. And among veterans, this percentage [can more than double](#), depending on their service era.

Rennaker, who served in the U.S. Marine Corps for five years, is part of a team that is conducting a clinical trial for a small, glass device that can be placed on the vagus nerve to electrically stimulate it for several treatments including stroke, spinal cord injury and PTSD recovery. This clinical trial is funded by the Defense Advanced Research Projects Agency, or DARPA.



currently in use for other treatments.

“We designed this solution so that veterans can have all standards of care,” said Rennaker. Because the device is made of glass, patients are still able to receive tests like MRIs – a powerful diagnostic tool – and other types of care without any interference with their device.

“They can have whatever they need. And it won’t interfere with the technology, so it never needs to come out,” he said.

Six participants have completed the treatment for PTSD as part of the clinical trial. All have recovered from their PTSD, Rennaker said. Four additional participants will undergo the PTSD treatment with the implanted device and are pending results.

So far, none of the participants have elected to have the device removed – even those who have completed their treatment.



A new Vagus Nerve Stimulator (front right) sits next to a phone running a system called ReThink and a Power and Communication Module (center), three tools that speak to each other to assist in quicker recovery from injury, including PTSD, in the Bioengineering and Sciences Building on campus on Monday, Aug. 1, 2022. Robert Rennaker, professor of neuroscience at The University of Texas at Dallas, is currently running clinical trials on the process. (Liesbeth Powers / Staff Photographer)





and others are not. This will allow researchers to account for potential placebo effects.

The initial results, however, are promising. Particularly considering the success rates of current treatments for PTSD, which are particularly low for veterans.

A class of antidepressants called SSRIs are commonly prescribed for PTSD, said Dr. Imanuel Lerman, a physician scientist at the University of California at San Diego. But only 20% to 30% of civilians experience remission using them. In the veteran population, this efficacy is even lower, said Lerman.

Lerman is not involved with the UTD research on VNS. He is conducting a clinical trial that is testing non-invasive VNS for several things, including the severity of PTSD symptoms and quality of life in veterans with PTSD. He is also exploring ways to record signals from the vagus nerve with the hope of fine-tuning therapy for patients using VNS.

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While there are always risks associated with surgical implants, newer, minimally invasive devices like the one being tested in Rennaker's trial can minimize those risks, said Lerman.

The future of VNS research, scientists hope, will offer patients and those who offer them treatment a way forward. And, as Rennaker emphasizes, the patients are who this is all for:

"I think it's critical to understand that everything we're doing is to improve the quality of life for human beings in the U.S. and across the world," he said.

*Jessica Rodriguez reports on science for The Dallas Morning News as part of a fellowship with the American Association for the Advancement of Science.*



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My Account



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