Chiao of University of Texas Arlington named Tech Titans Technology Innovators Award Winner

Tech Titans + Fast Tech: Technology Innovators Award Winner, J.C. Chiao

Think of it as a pacemaker for the stomach.

That's one of the medical devices Dr. J.C. Chiao is trying to bring to market. The device, called a gastric stimulator, could eventually help some of the more than 170 million people worldwide who suffer from gastroparesis, or partial paralysis of the stomach.

The disease often develops in patients with a long history of diabetes or those undergoing chemotherapy.

People suffering from gastroparesis have disrupted digestion, feel nauseated, frequently vomit and aren't able to get proper nutrition.

"With gastroparesis, the patient's stomach doesn't move," Chiao said. "Basically, what we do is we develop a pacemaker to jump-start the stomach."

The small stimulator Chiao and his team came up with forces the stomach to contract and move food properly. It can be implanted during a 30-minute surgery.
outpatient procedure through the mouth, using an endoscope, and without surgery, he said.

The device needs to undergo FDA testing, so it will be four to five years before it’s ready for clinical application, he said.

The closest competition for treatment of gastroparesis and other stomach motility disorders is a much larger neurostimulator device that requires a three-hour surgery under general anesthesia and hospitalization afterward, he said. Chiao’s device is smaller than half a postage stamp.

A small controller that mounts on a necklace or belt wirelessly activates the implant to set off weak electrical impulses that stimulate the stomach tissues, making the stomach move to properly digest food.

The device also has applications for obesity control, Chiao said. After a patient eats, the stimulator can make the stomach move in an out-of-sync way to make the patient feel full, he said.

About 171 million people had gastroparesis in 2000 and 366 million are expected to have the condition by 2030, according to the World Health Organization.

Chiao is working with a team of clinicians from the University of Mississippi Medical Center and Texas Health Resources to further the development of the patent-pending device.

In addition to his UT Arlington job, Chiao is an adjunct associate professor of internal medicine at the University of Texas Southwestern Medical Center. His research achievements are multidisciplinary, covering electrical and mechanical engineering, optics, nanotechnology, wireless technologies, biotechnology and medicine.

Dr. Rajeev Jain, a partner at Texas Digestive Disease Consultants and chief of gastroenterology Texas Health Dallas, is working with Chiao on the gastric stimulator.

“He’s doing some amazing things with trying to take different technologies and miniaturize them and then apply them where there’s a need in digestive disorders, Rajeev said.

In addition to the gastric stimulator, Chiao has developed implantable sensors that help treat severe acid reflux, sensors to test treatments for illnesses that can lead to cancer, and, in collaboration with other researchers, neurostimulators designed to detect and block pain signals.

Chiao said he has long been fascinated by the promise that engineering holds for medicine.
“I believe that engineering can offer a lot to reduce health care costs by implementing some comfortable and convenient ways to monitor the patient or to treat the patient or to let the patient control their own management of illness,” he said.

Chiao encourages his students to explore a similar career path.

“The medical market is an area of growth,” he said. “We’re all getting older. I believe if a student has a dual talent across engineering and medicine, they are better off for the future.”

Bill covers health care, law, education and nonprofits.