About 100 million Americans suffer from chronic pain that can lead to other physiological conditions such as raised blood pressure and glucose levels, decreased digestive activity and blood flow, and psychological problems such as fear, depression, isolation, anxiety, insomnia and suicidal tendency. Neurostimulation has been demonstrated to reduce chronic pain. However, present stimulators are open-loop systems in which doctors can only obtain the results of pain management from patients’ verbal descriptions. Therefore, clinicians are unable to physiologically document the pain signals in quantitative values in order to prescribe the right dose for treatment.

To address this issue, researchers at UT Arlington have developed Automatic Pain Recognition and Inhibition (APRI) sensor, a wireless, integrative system consisting of a miniature neuronal signal sensor and stimulator implants. APRI provides intelligent feedback through a closed-loop to constantly monitor pain signals and suppress them when they surpass the patient’s tolerance level. This approach will automatically adjust the ‘dose’ to give maximum comfort to the patient, while decreasing harmful side effects due to over-medication with powerful drugs.

Meet the Inventor

Dr. Chiao is a Professor in the Department of Electrical Engineering, UT Arlington. Chiao is a prime example of a Renaissance man: His interests and expertise span a wide spectrum of research activities and artistic pursuits – esophageal reflux, MEMS, children’s books, wireless devices, optical fibers, paper cutting, pain management, classical music, millimeter-wave sensors, engineering education, and more.