

Stretchable, wearable coils may make MRI, other medical tests easier on patients

February 26 2020, by Chris Adam



The Purdue University team developed RF coils that are formable and stretchable for medical imaging. Credit: Joseph Rispoli/Purdue University

Anyone who has had a mammogram or an MRI knows how uncomfortable and awkward the tests can be. Now, Purdue University researchers have taken technology used in the defense and aerospace industries to create a novel way of doing some medical imaging.

One reason the tests are uncomfortable is that they often use rigid radio-frequency (RF) coils to detect signals from the body. Now, the Purdue team has developed RF coils that are formable and stretchable.

"Imagine going for an imaging session and they strap on a comfortable fabric with the coils embedded inside," said Joseph Rispoli, an assistant professor of [biomedical engineering](#) and electrical and computer engineering in Purdue's College of Engineering. "We created an adaptable, wearable and stretchable fabric embroidered with conductive threads that provides excellent signal-to-noise ratio for enhanced MRI scanning."

The Purdue team's work appeared in the journal *IEEE Transactions on Biomedical Engineering*.

Current approaches to enhancing signal-to-[noise ratio](#), known as SNR, include shaping receive [coil](#) arrays to encompass a generalized form of the body part of interest, but these are often rigid and require the patient be posed in a specific way. The Purdue flexible and stretchable coil could be placed close to the skin on an area or joint, regardless of its positioning.

The thread technology used in the Purdue innovation is similar to that found in applications for the aerospace and defense industries. Rispoli said the technology also is applicable to breast MRI and to enhancing medical device communication using wearable or implantable antennas.

"Our preliminary results show a full-scale device will be superior in all

aspects of diagnostic testing, including increased sensitivity and fewer [false positives](#)," Rispoli said.

The researchers are looking for partners to continue developing their technology. The Purdue innovators also presented the technology at the International Society for Magnetic Resonance in Medicine Annual Meeting and the IEEE International Engineering in Medicine and Biology Conference.

More information: Jana Vincent et al, Conductive Thread-Based Stretchable and Flexible Radiofrequency Coils for Magnetic Resonance Imaging, *IEEE Transactions on Biomedical Engineering* (2019). [DOI: 10.1109/TBME.2019.2956682](#)

Provided by Purdue University

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