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Inventors

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US - Piezo Micro-Markers for Ultrasound Medical Diagnostics

A long standing problem in medical diagnostic ultrasound imaging is its relatively poor contrast for small medical devices introduced inside the body. Plastic catheters, stents, small metal clips, needles, radiographic markers, and many small surgically implanted devices cannot be easily seen on ultrasound images due to the physics of ultrasound interactions. This limits the utility of ultrasound as a medical imaging tool and requires the alternate and less desirable use of x-ray radiography.

Researchers at ASU have shown that microchips of certain inexpensive ceramic and polymer materials integrated into biomedical implants generate electrical signals when scanned by ultrasound. They have found that the generated signals can be detected by a specially outfitted ultrasound imaging probe and used to image small implanted devices. Real-time ultrasound images have been made of these materials in tissue as deep as 7 cm. This technique extends the functionality of medical diagnostic ultrasound imaging systems and may be a way to substantially reduce the use of x-ray radiography in certain medical applications.

Potential Applications

This technology may be used to improve or create a variety of medical imaging and positioning procedures including

- Ultrasound Imaging of Implanted Devices – Ability to image medical devices implanted in the body which has not been possible with current ultrasound technology.
- Surgical Positioning of Implantable Devices –Devices such as catheters, radiographic markers, and stents can be positioned with more precision using this real-time imaging technology.
- Reference Markers for Radiation Therapy – Small marker chips may be introduced into the body via a syringe needle and serve as reference markers for re-positioning patients undergoing repetitive treatments of radiation therapy.

Benefits and Advantages

- Reduction of X-ray Radiography – Can be used to accomplish imaging tasks previously attainable only through X-ray radiography.
- Compatibility -Can be integrated into existing ultrasound equipment circuitry
- Wireless – Imaging and positioning tasks can be accomplished without the use of electrical connectors to the implanted devices.

For more information about the inventor(s) and their research, please see [Dr. Towe's Directory webpage](#)

