

## **Adaptive ultrasound frequency selection**

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### **Unmet Need**

Acoustic clutter is a phenomenon that contributes to poor quality ultrasound images. It often manifests as haze with grainy patterns that overlay the true ultrasound image and reduces the conspicuity of targets by decreasing contrast and obscuring target detail. Major sources of clutter can include reverberation, phase aberration and offaxis scattering from bright reflectors. Studies show that acoustic clutter is the dominant source of image degradation in abdominal imaging. While techniques to improve image quality are being developed, clutter removal remains an unsolved problem despite decades of research.

### **Technology**

Researchers from Prof. Gregg Trahey lab have developed a method that enhances ultrasound image quality and automates optimization of imaging frequency. In this method, called lag one coherence (LOC), a series of pre-imaging pulses are transmitted over a range of frequencies. The data from this frequency sweep is processed offline to calculate novel coherence-based “conspicuity metrics” and select the frequency that produces the image with maximal conspicuity. This optimal frequency is then used for target imaging. This process takes fractions of a second and therefore can be performed continuously in real-time. Since the method relies on an analytical approach as opposed to empirical evaluation of image quality, it allows for automation of the process, thus easing work for the scanner operator. This technology has been demonstrated with a commercial ultrasound system on patient volunteers.

### **Advantages**

- Improves quality of image by reducing acoustic



clutter

- Automatic real time frequency optimization
- Can be implemented on any ultrasound scanner with the access to raw channel signals

### Duke File (IDF) Number

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### Meet the Inventors

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### Department

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Biomedical Engineering (BME)

### Publication(s)

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### External Link(s)

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• [From the lab of Prof. Gregg Trahey](#)

