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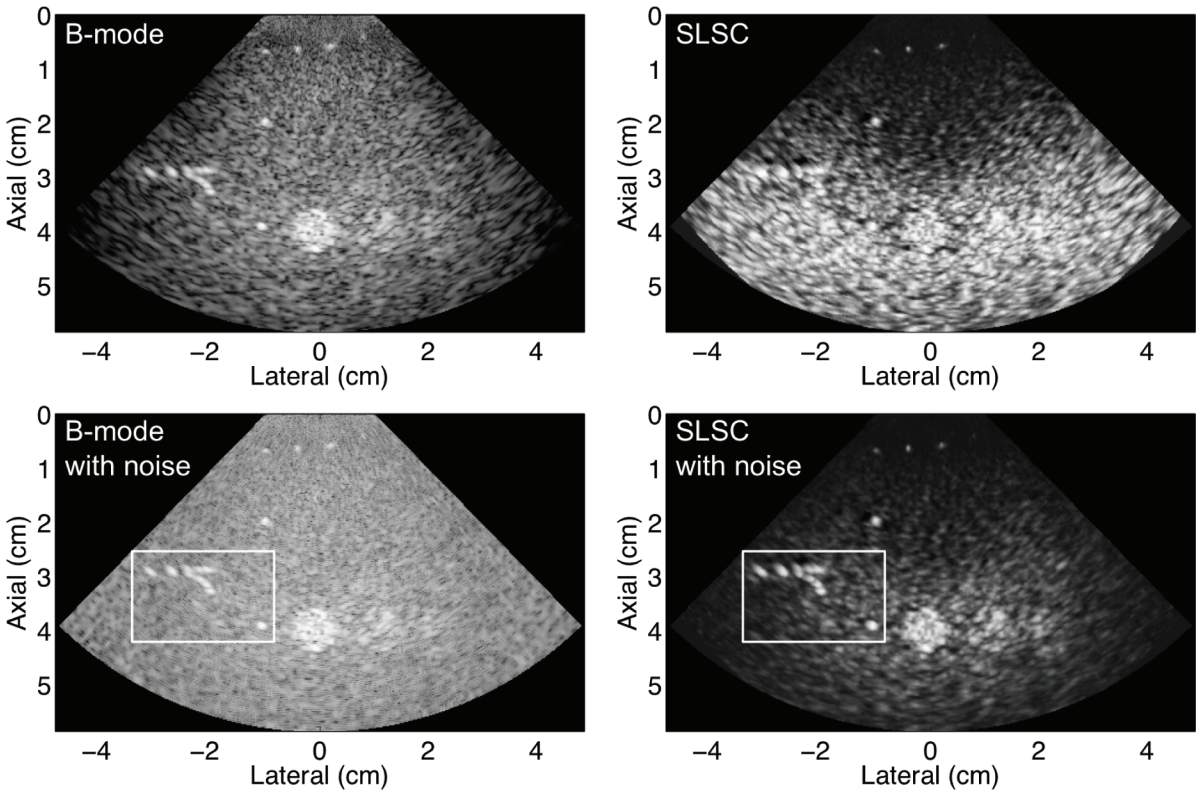

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Short-Lag Spatial Coherence (SLSC) Imaging Improves Point Target Visibility in High-Noise Environments

Conventional B-mode images from difficult-to-image patients contain high clutter magnitudes that obscure important anatomical features. This clutter can be reduced with a revolutionary approach to ultrasound image formation that utilizes local measurements of the spatial coherence of backscattered echoes, i.e., short-lag spatial coherence (SLSC) imaging. The top row shows conventional B-mode (left) and SLSC (right) images of an experimental phantom containing point targets, lesions, and background scatterers. However, the level of noise in phantom images is not representative of clinically challenging images; therefore, noise was added to the channel data, revealing enhanced point target visibility and resolution within the focal zone of the SLSC image when compared to the B-mode image (see boxed regions in bottom row). Results indicate that point-like structures (e.g., microcalcifications, needles) are better visualized in SLSC images in the presence of speckle, clutter, and acoustic noise, which occurs naturally due to poor body habitus. For more details, see the accompanying article on page 1265 of this issue.

Images courtesy of Muyinatu A. Lediju Bell, Jeremy J. Dahl, and Gregg E. Trahey. The authors are with the Department of Biomedical Engineering, Duke University, Durham, NC 27708, USA. M. A. Lediju Bell is also with the Engineering Research Center for Computer-Integrated Surgical Systems and Technology (CISST ERC), Johns Hopkins University, Baltimore, MD 21218, USA. J. J. Dahl is also with the Department of Radiology, Stanford University, Palo Alto, CA 94305, USA. G. E. Trahey is also with the Department of Radiology, Duke University Medical Center, Durham, NC 27708, USA.