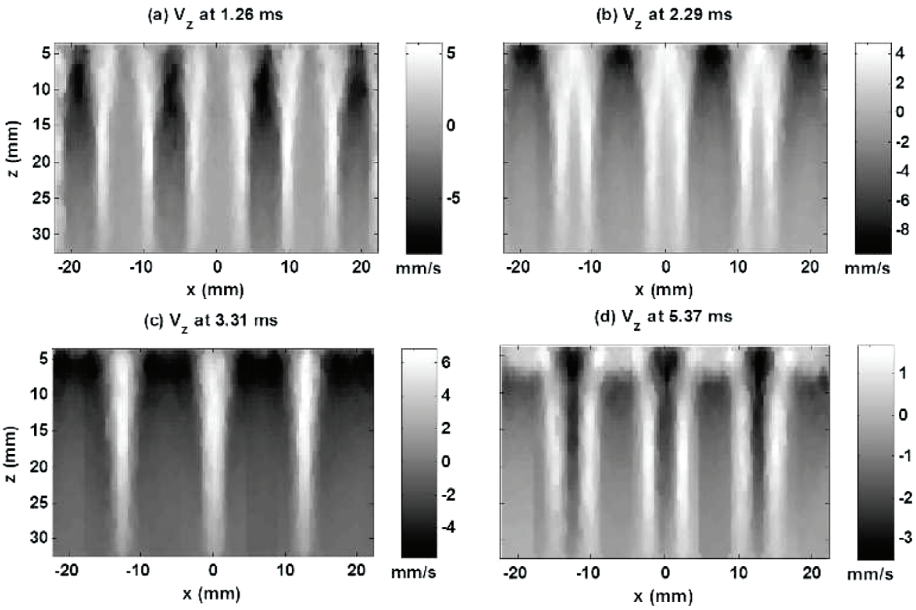
IEEE TRANSACTIONS ON

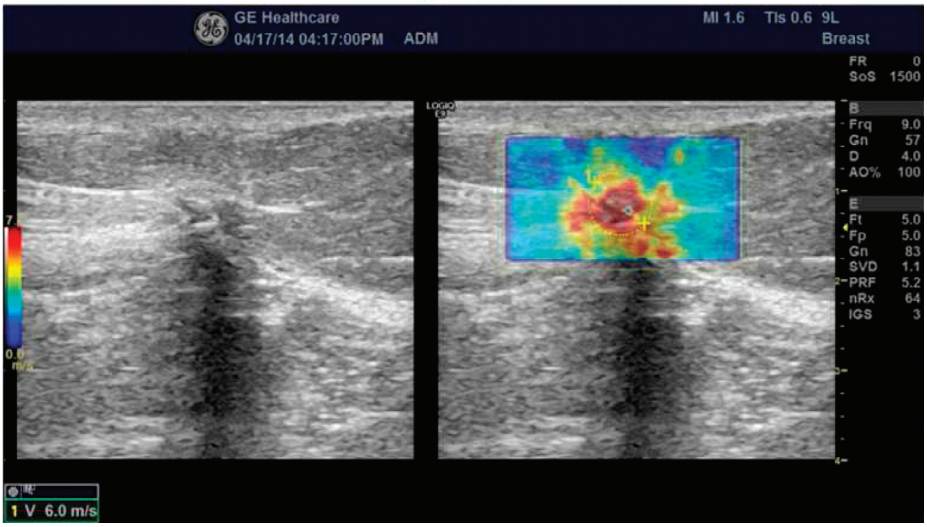
ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL

A PUBLICATION OF THE IEEE ULTRASONICS, FERROELECTRICS, AND FREQUENCY CONTROL SOCIETY

FEBRUARY 2015 VOLUME 62 NUMBER 2 ITUCER (ISSN 0885-3010)



(e) B-mode (left) and 2D elastogram (right) of a malignant breast mass



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DOI http://dx.doi.org/10.1109/TUFFC.2015.620201

Two-Dimensional Shear Wave Elastography on Conventional Ultrasound Scanners With Time-Aligned Sequential Tracking (TAST) and Comb-Push Ultrasound Shear Elastography (CUSE)

The accompanying paper presents the time-aligned sequential tracking (TAST) and comb-push ultrasound shear elastography (CUSE) methods to realize 2-D shear-wave elastography on conventional ultrasound scanners with low imaging frame rate (compared to a plane wave imager). Parts (a) to (d) show snapshots of the CUSE shear wave propagation movie obtained at different time instants. A 4-tooth focused comb-push was transmitted and the resulting shear waves were tracked by TAST. Part (e) shows a B-mode image and a 2-D elastogram of a breast case study with a highly suspicious mass. The 2-D elastograms shows good contrast between the mass and the surrounding tissue. The stiffness of the mass (shear wave speed = 6.0 m/s) is much higher than the normal breast tissue (shear wave speed = 1.9 m/s). The pathology result from biopsy revealed the mass as invasive mammary carcinoma Nottingham grade III of III. For further reading, please see the accompanying image on page 290 of this issue.

Images courtesy of Pengfei Song, Michael C. Macdonald, Russell H. Behler, Justin D. Lanning, Michael H. Wang, Matthew W. Urban, Armando Manduca, Heng Zhao, Matthew R. Callstrom, Azra Alizad, James F. Greenleaf, and Shigao Chen. P. Song, M. W. Urban, A. Manduca, H. Zhao, A. Alizad, J. F. Greenleaf, and S. Chen are with the Department of Physiology and Biomedical Engineering, Mayo Clinic College of Medicine, Rochester, MN. A. Alizad is also with the Department of Internal Medicine, Mayo Clinic College of Medicine, Rochester, MN. M. C. Macdonald, R. H. Behler, J. D. Lanning, and M. H. Wang are with General Electric Healthcare, Wauwatosa, WI. M. R. Callstrom is with the Department of Radiology, Mayo Clinic College of Medicine, Rochester, MN.