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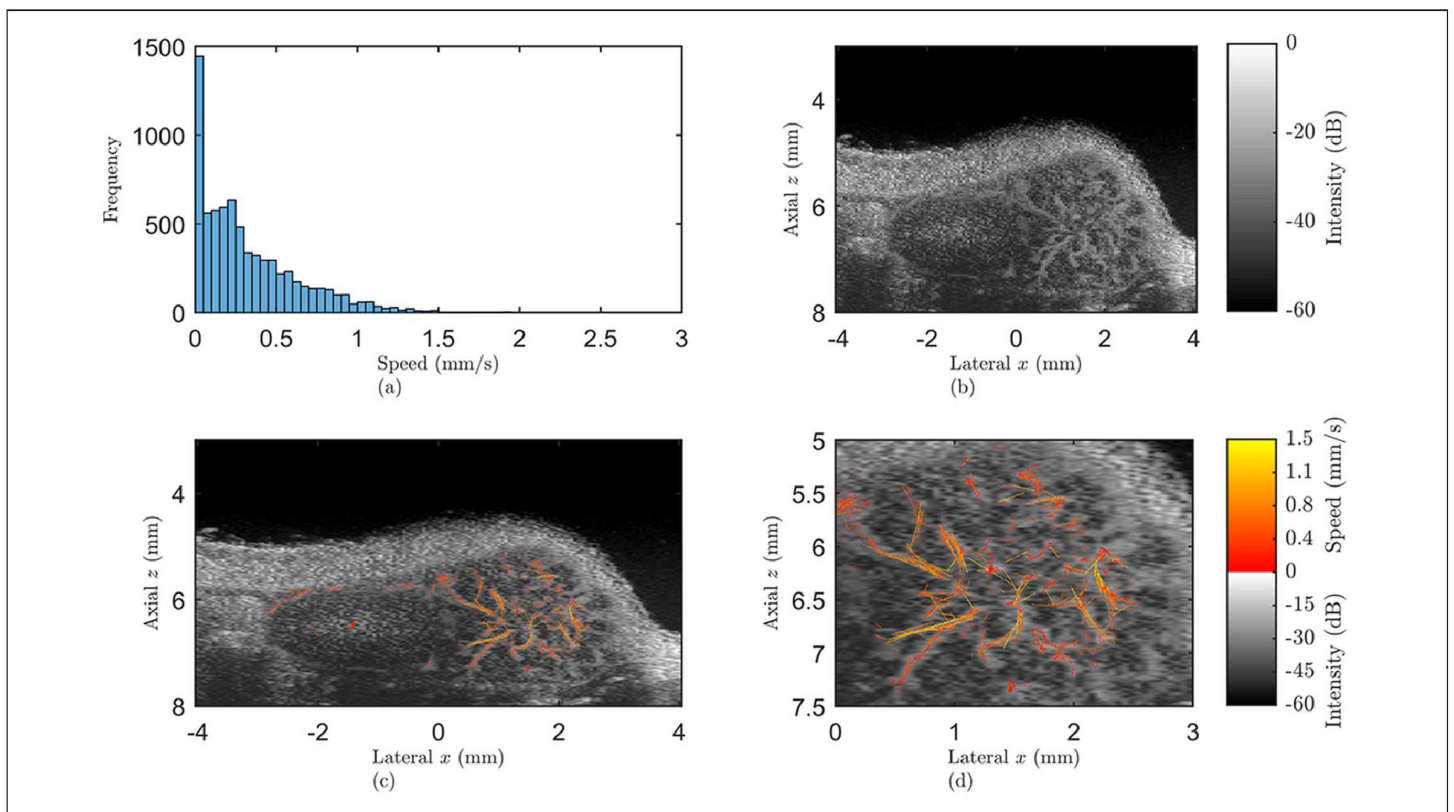
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Detection and Tracking of Multiple Microbubbles in Ultrasound B-Mode Images

Microbubbles are used as a contrast agent for ultrasound imaging. At a sufficiently low concentration individual MBs can be seen flowing through the vessels and microvasculature in B-mode images. In an *in vivo* experiment a murine xenograft tumor was imaged with a high frequency ultrasound system (Vevo 2100, Visualsonics). The first step was to detect the positions of single microbubbles in superresolution from interpolated B-mode images. In a second step, the velocity of single microbubbles was estimated using a Markov chain Monte Carlo data association algorithm. (b) The maximum intensity persistence image of the acquired cine-loop shows the microvessel morphology of the tumor model with the system's resolution. (c) The velocities of the microbubbles were used to create a superresolution velocity map. The more microbubbles pass the vessels, the more the image shifts from single trajectories to a velocity map. (d) Enlarged view of the vascular tumor area. (a) The velocity histogram calculated from all microbubbles' velocities. The values are in a good agreement with literature values for microvasculature in tumors.

Images are courtesy of Dimitri Ackermann and Georg Schmitz, Ruhr-Universität Bochum, 44780 Bochum, Germany.

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