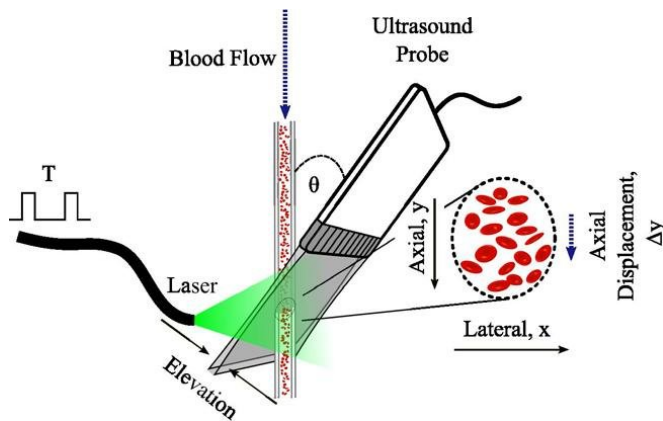


New research reports advances in measuring blood flow velocity in deep tissue

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Experimental setup for blood flow velocity measurements using AR-PAF. A polyethylene tube of 580 μ m inner diameter serves as a vessel phantom. It is illuminated with successive laser pulses to generate PA signals. Blood flow through the tube is controlled using a syringe pump. The PA signals are detected with a 64 element ultrasound transducer array (center frequency=15MHz). The array is positioned such that a cross section of the tube is imaged, and the orientation at an angle θ to the tube enables motion of the cells to be observed as a displacement in the axial direction of the transducer. The phantom and the transducer were held in place using custom-made holders. Credit: Thore M. Bücking; Pim J. van den Berg; Stavroula Balabani; Wiendelt Steenbergen; Paul C. Beard; Joanna Brunker

In an article published in SPIE's *Journal of Biomedical Optics*, researchers announce new advances in measuring blood flow velocity in deep tissue. Blood flow speed is a critical element in assessing tissue functionality as well as diagnosing diseases, and photoacoustic flowmetry (PAF) is already acknowledged as a promising technique for deep tissue measurement of blood flow velocity. The new work demonstrates successful use of a handheld ultrasound probe common in

clinical settings, paving the way to explore the feasibility of measuring flow in a physiologically realistic situation.

The article, "Processing methods for photoacoustic Doppler flowmetry with a clinical ultrasound scanner," by Thore M. Bücking, Stavroula Balabani, Paul C. Beard, and Joanna Brunker of University College London, and Pim Jasper van den Berg and Wiendelt Steenbergen of University of Twente, outlines key steps in their processing methods - including image filtering, motion detection, and masking - that bring photoacoustic flowmetry an important step closer to clinical applicability, according to *Journal of Biomedical Optics* editor, Andreas Mandelis.

"The manuscript by Brunker and her colleagues has reported, I believe, one of the most important steps forward in photoacoustic flow measurements, by using a clinical ultrasound array, human whole blood, and wide-field optical illumination in AR-PAF settings," says Mandelis. "This long-overdue work is extremely exciting for the photoacoustic imaging community, and can potentially bring photoacoustic flow imaging into clinical practice."

More information: Thore M. Bücking et al, Processing methods for photoacoustic Doppler flowmetry with a clinical ultrasound scanner, *Journal of Biomedical Optics* (2018). DOI: [10.1117/1.JBO.23.2.026009](https://doi.org/10.1117/1.JBO.23.2.026009)

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