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### **Time-Reversal Acoustics in Biomedical Engineering**

Mathias Fink, Gabriel Montaldo and Mickael Tanter

Laboratoire Ondes et Acoustique, ESPCI, Université Paris 7, CNRS, 10 rue Vauquelin, 75005 Paris, France

Time-reversal is a very powerful method for focusing through complex and heterogeneous media and shows very promising results in biomedical applications. In this presentation, we review some of the main applications investigated during the past decade. An iterative implementation of the time-reversal process allows tracking gallstones in real time during lithotripsy treatments. In this application domain, a smart exploitation of the reverberations in solid waveguides permits the focusing of high amplitude ultrasonic shock waves with a small number of transducers. Because time reversal is able to correct the strong distortions induced by the skull bone on ultrasonic propagation, this adaptive focusing technique allows brain ultrasonic therapy through the skull bone. Finally, time-reversal focusing guided by speckle noise can be implemented to correct distortion in medical ultrasonic imaging and recent results will be presented.