

## Laymen Summary

Quantitative ultrasound (QUS) imaging aims at quantifying physical phenomena associated with the propagation of ultrasound in tissue, with the ultimate goal of determining the tissue microstructure. QUS techniques include attenuation evaluation, speed of sound evaluation, backscatter estimation, and envelope statistics. These techniques have been applied in multiple clinical applications such as liver steatosis, cervical ripening detection, bone properties assessment, and oncology. This study reviews the recent clinical applications of quantitative ultrasound with a special focus on oncology, as well as evaluates the current state of the implementation of QUS technology into clinical devices. The underlying physics of each quantitative ultrasound modality is explained in a comprehensive manner, and the aspects impeding the widespread clinical implementation of QUS are also investigated and discussed. Lastly, the potential of deep learning methods to enhance the accuracy, speed, and quality of quantitative ultrasound imaging is discussed.