

Master's Thesis

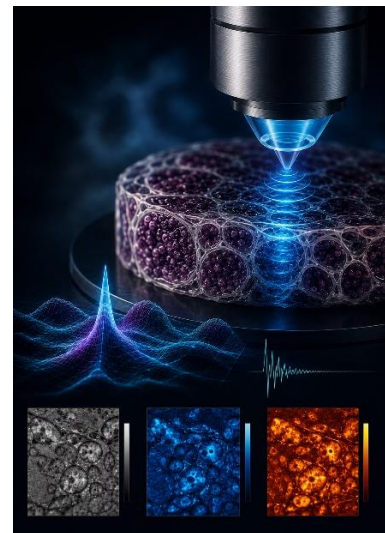
EXPLORING THE IMAGING CAPABILITIES OF SCANNING ACOUSTIC MICROSCOPY FOR BIOMEDICAL RESEARCH

Scanning Acoustic Microscopy (SAM) is a powerful, non-destructive imaging technique providing intrinsic contrast based on the mechanical and elastic properties of materials. While well established in materials science and quality inspection, its potential for biomedical imaging remains largely unexplored.

This is particularly promising as pathological changes often affect the morphology and mechanical properties of biological tissue. SAM may therefore provide a label-free approach to visualize such alterations and to detect foreign particles or contaminants, such as microplastics in biological tissue.

The focus of this experimental Master's thesis is to:

- Investigate the physical origin of acoustic image contrast in biological samples.
- Characterize imaging performance in terms of spatial resolution, contrast, and sensitivity.
- Develop imaging workflows and tailored signal and image processing methods.
- Correlate acoustic contrast with morphological and mechanical tissue properties
- Evaluate the potential of SAM for label-free biomedical imaging and contamination analysis.



The thesis combines experimental physics, acoustic and optical microscopy, advanced signal processing, and biomedical imaging, offering the opportunity to explore fundamental physical principles of image formation while applying cutting-edge experimental methods to real-world biomedical challenges.

Interested? Contact us (ro.nuster@uni-graz.at or peter.banzer@uni-graz.at) or just drop by!