

GREMAN seminar

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Spectral-based quantitative ultrasound to estimate tissue microstructure

2pm - 3pm (petit amphitheatre - INSA CVL - Blois)

Quantitative ultrasound (QUS) techniques based on frequency analysis of backscattered signals can be used to characterize tissue microstructure. These signals contain information on the spatial arrangement, size, concentration and mechanical properties of the scatterers (i.e. cells). The backscatter coefficient is estimated from experiments and is fit to a model. The fit parameters are often termed QUS estimates and are used to characterize the scattering properties of the tissue under investigation. Nevertheless, for physical interpretation of QUS estimates to be accurate, the scattering model chosen must also be accurate. First, I will present a brief overview of classical ultrasound scattering models and their preclinical and clinical applications for differentiating normal and pathological tissues, or for monitoring cancer therapies. Second, I will present the structure factor model adapted to concentrated scattering medium and its application to characterize blood suspensions and cancerous tumors. In particular, we will see how ultrasound backscatter measurements make it possible to differentiate normal (deformable) versus pathological (rigid) blood cell suspensions, or to monitor a cell death process during anticancer chemotherapy.