

Signal Processing of Ultrasound Guided Waves in Human Tibia

PROJECT DESCRIPTION

"Osteoporosis is a widespread bone-weakening disease with significant morbidity and mortality affecting over 200 million people throughout the world, especially the elderly and post-menopausal women. In Canada, at least 1 in 3 women will suffer from an osteoporotic fracture during their lifetime. The disease is mainly characterized by bone mass loss, cortical thinning, and microstructure deterioration of bone tissue subsequently inducing brittle bone. The prevalence of osteoporosis and osteoporotic fractures rises up exponentially with a rapid growth of the aged population, which significantly increases the associated health-care costs. Currently, dual energy X-ray absorptiometry (DEXA) is the gold standard to measure bone mineral density (BMD) for osteoporosis assessment. One of the shortcomings of the technique is its incapability to provide the bone mechanical properties, most notably elastic parameters, which are important determinants of bone quality.

The use of ultrasound to study bone properties has shown promises using data from simulation, phantom, ex-vivo, and in-vivo studies. Especially, UGW traveling along the cortical long bones are very sensitive to the geometric, architectural, and material properties of the cortex. The objective of this project is to analyze UGW from long bone data and extract useful elastic information. The success of this project will advance our knowledge and technology toward improving disease diagnostics. This is an international collaboration project with Fudan University."

FACULTY-DEPARTMENT

Medicine - Radiology & Diagnostic Imaging

DESIRED FIELD OF (STUDENT) STUDY

The candidate should have background in physics, mechanical engineering, biomedical engineering, or similar with experience in MATLAB; knowledge in signal processing; good organization, verbal/writing communication skills in English; last but not the least, good attitude to learn and be flexible with changes in all aspects.

INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

NUMBER OF INTERNSHIP POSITIONS

1

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)
University of Alberta International
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INTERNSHIP START DATE

July 4

INTERNSHIP END DATE

3 months after start date

ARE THE DATES FLEXIBLE?

Yes, I am flexible regarding the internship dates. Selected students can contact me to request a date change.