



West Australian Bone Research Collaboration



Industry Linked PhD Scholarship
Full-Time, \$30,000 p.a., for Three Years

- Project Title:** Developing an artificially intelligent method to automate the examination of bone health and diagnostic utility of disease-specific characteristics from peripheral Quantitative Computed Tomography (pQCT) scans.
- Project Aim:** Develop novel musculoskeletal pQCT biomarkers through artificial intelligence, via machine learning, utilising a “deep learning” process.

Background.

The [WABRC](#) is a collaborative and multidisciplinary research group that services the community and provides targeted preventative and remedial programs for the primary or secondary prevention of osteoporosis, regardless of its cause.

Our prior work has shown the utility of peripheral Quantitative Computed Tomography (pQCT) for the macroscopic investigation of bone parameters in three-dimensions and through higher resolution imaging using low radiation doses. Despite its enormous potential, automated image screening and analysis methods for pQCT are still in their infancy.

Problem.

State-of-the-art methods in pQCT still compute a limited number of structural properties which are determined by a limited number of human crafted features. In addition to that, the majority of these methods require precise cross-sectional segments of bone to determine structural mechanical properties, and depending on the algorithms in use, these segmentations fluctuate considerably and computed structural properties vary.

Artificial intelligence or more specifically deep learning provides a potential insight in the interaction of various musculoskeletal properties related to disease-specific features and other structural changes that are apparent in the image with repeated imaging.

Project.

The proposed project aims to bring deep learning (subset of machine learning) to discover and extract the optimal set of material and structural musculoskeletal clinical features from pQCT data to explore bone disease.

Candidate.

The ideal candidate will have a strong artificial intelligence/machine learning background established through their Bachelors and Honours or Masters by Research degrees. They will have an interest in health applications.

Supervision:

The successful PhD candidate will be formally and informally supervised by a multidisciplinary team of clinicians and researchers nationwide including: A/Prof Paola Chivers (University of Notre Dame Australia), Dr Nicolas Hart (Flinders University), Dr Sajib Saha (CSIRO), Dr Timo Rantalainen (University of Jyväskylä), and Professor Aris Siafarikas (Perth Children’s Hospital).