

IMPROVING DIAGNOSIS AND TREATMENT OF BREAST CANCER USING AUTOMATED BIOMECHANICS

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Summary: Breast cancer affects 1 in 9 New Zealand women. Early detection is key to improving the likelihood of survival. We have developed an innovative breast image analysis technology to help with breast cancer diagnosis. This technology integrates state-of-the-art image processing techniques, personalised 3D biomechanical modelling, and population-based statistical analysis to create a fully automated clinical pipeline designed to help address clinical challenges in the interpretation of medical images to improve diagnosis and treatment of breast cancer. This pipeline is being implemented in collaboration with breast radiologists at Auckland City Hospital. Pilot studies are underway using clinical magnetic resonance images to assess the efficacy of this technology for predicting the motion of breast tumours from the prone position to the supine position, in which treatment procedures such as surgery and radiotherapy procedures are performed. Our long-term vision is to address a variety of clinical issues for breast cancer patients using automated construction and application of personalised biomechanical models. This research has the potential to lead to technological advancements in the breast cancer imaging field, which would directly translate into better health outcomes for New Zealand women and improve breast care practices world-wide.