

NON -TECHNICAL ABSTRACT: *(State in layman's terms the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project for California.)*

Prostate cancer is the most common cancer in men after skin cancer with approximately 16% of men diagnosed with the disease during their lifetime. The probability of occurrence increases with ages beyond 70 years old. American cancer society predicts 192,280 new cases of prostate cancer in 2009. In 2007, approximately 22,515 of those cases were just in the state of California according to a statewide population-based cancer surveillance system. Current treatments for prostate cancers involve surgery and chemotherapy, and are expensive. New techniques with ultrasound are being developed and tested to treat the disease in an outpatient setting. One such technology is to use an ultrasound catheter that is introduced into the urethra and positioned next to the prostate. High intensity ultrasound energy is then propagated into the cancer to raise its temperature beyond 52°C to kill the cancer. Other similar technologies involve microwave energy or lasers. To control the deposition of energy in the tissue, Magnetic Resonance Imaging (MRI) is used in a specific configuration for temperature monitoring. MRI is very effective for this application but cost, procedure time, setup and accessibility is a problem. Ultrasound imaging methods could offer a potential solution. In this application, we propose to design and develop Ultrasound Strain Imaging algorithms in combination with trans-rectal ultrasound as a tool for verifying and monitoring prostate thermal ablation treatments. Following real-time implementation, we propose to test in tissue mimicking media and ex-vivo tissue for this project. Thus the potential benefit of the proposed project is significant not only for local California residents but anyone requiring prostate treatment.