

**TECHNOLOGY LICENSING OPPORTUNITY**

# Surface Identification Using Microwave Signals for Microwave-Based Detection of Cancer

**FEATURES**

The inventors previously developed a novel imaging technique for detecting breast cancer (see WARF reference number P01386US). This technique makes use of the sharp contrast in dielectric properties between breast carcinomas and normal tissue at microwave frequencies. Like most microwave-based breast imaging algorithms, it relies upon knowledge of the location of the breast surface relative to the transmitting and receiving antennas; however, this location is unknown a priori and varies from patient to patient. *This invention provides a data-adaptive algorithm that uses reflected microwave signals to estimate the location of the skin-breast interface relative to the antenna locations.* This approach is based on geometric principles and the fact that the impedance mismatch at the skin-breast interface results in significant backscatter. First, a matched filter is applied to the backscattered signal in each antenna channel to determine the propagation time from the antenna to the skin-breast interface. The propagation time locates the interface on a circle with a known radius. The breast surface is assumed to be convex and tangent to the circle. A tangent point, which defines the intersection of the circle and breast surface, is determined for each antenna by assuming that the circles centered at adjacent antennas intersect the same tangent line. The resulting set of tangent points from the antenna locations is fit with a curve, which defines the breast-skin interface.

**BENEFITS**

- Provides an estimate of the location of the breast surface, which is needed to account for propagation effects in high-performance lesion detection and imaging algorithms
- Works with the imaging technique described in WARF reference number P01386US

**INTELLECTUAL PROPERTY STATUS**

Patent applied for.

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