

# Breast Tumor Margin Detection System Using Spatially Offset Raman Spectroscopy

## Summary

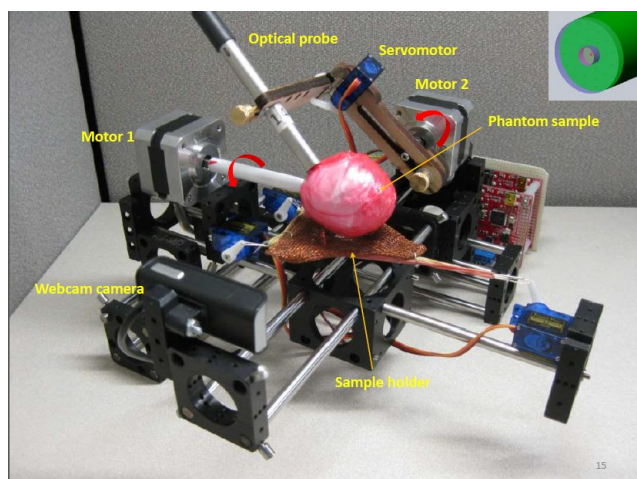
Vanderbilt University researchers have developed a technology that uses spatially offset Raman spectroscopy to obtain depth-resolved information from the margins of tumors. This helps to determine positive or negative tumor margins in applications such as breast lumpectomy, and the technology is currently being investigated for breast cancer margin detection.

## Addressed Need

- Breast conserving surgery currently relies on standard histopathology to examine surgical margins, forcing a large percentage of women to later undergo a second tumor removal surgery when it is discovered that the surgeon excised an insufficient margin around the tumor
- Current intra-operative techniques available for examining margins around tumors have significant shortcomings in terms of accuracy, time, and/or cost, thus there is a clear need for an automated, real-time method to assess surgical margins in breast conserving surgery

## Technology Description

This technology uses spatially offset Raman spectroscopy (SORS) to obtain depth-sensitive information from the margins of tumors to determine whether a sufficient safety zone exists around the tumor to minimize the risk of local recurrence. The device displays results as an image. The technology has been used to successfully detect breast tumor signatures below 1-2 mm of normal in vitro breast tissue.



## Unique Features

- Faster and more accurate reading than traditional methods of margin detection
- Raman spectroscopy technique is less expensive than other intra-operative techniques

## Intellectual Property Status

- The technology is currently protected by US Patent 9,020,581 and by unpublished US Patent application 14/085,732.
- Publication: Keller, M. D., Vargis, E., de Matos Granja, N., Wilson, R. H., Mycek, M.-A., Kelley, M. C., & Mahadevan-Jansen, A. (2011). [Development of a spatially offset Raman spectroscopy probe for breast tumor surgical margin evaluation](#). *Journal of Biomedical Optics*, 16(7), 077006
- Clinical trial: [Optical Spectroscopy in Evaluating Tumor Margins in Patients Who Have Undergone Surgery for Breast Tumors](#)

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