

## Titanium Clip Metal Detector to Aid Breast Surgery (2016-053)

*Assists surgeons with localizing breast cancers without insertion of additional devices into the breast*

### Market Overview

This handheld metal detector aids surgeons with localizing breast cancers, eliminating the need for invasive procedures. With the increased use of mammographic screening, breast cancer is more frequently detected as a radiographic lesion only rather than a palpable mass. This has made image-directed localization a necessity for surgical excision in a significant proportion of cases. When a patient has an abnormal mammogram, a radiologic breast biopsy is performed and a titanium clip is placed at the biopsy site to mark the site of the cancer. When a patient has a surgical localization procedure, a wire, radioactive seed, or reflective device are all placed adjacent to the site of the titanium clip to guide the removal of the cancer with the clip. MUSC Health and Clemson University researchers have developed a method to directly detect the titanium clip without an invasive procedure to localize the lesion. This approach eliminates the need for invasive procedures and will save time for the patient, reduce pain, eliminate fees associated with the localization procedure, and improve operating room utilization.

### Application

Breast cancer localization

### Stage of Development

Proof-of-concept

### Advantages

- Eliminates invasive procedures to localize clip, increasing patient comfort
- Facilitates operating room scheduling and workflow, reducing wait time and fees for patients

### Technical Summary

This titanium metal detector localizes titanium biopsy clips placed at the site of breast tissue biopsies. The device is a handheld metal detector that can be inserted into a surgical incision to help locate small titanium markers without an invasive procedure to insert a localizing wire or radioactive seed. The device uses a two-step detection system which is initiated by running the scanning wand across the patient's breast as a means of rapidly guiding clinicians to the marker's general location. Once an approximate location is determined, the probing wand is used to identify the marker's precise location. An incision is made and the probing wand guides the surgeon's path to the marker through continuous feedback. The system relates proximity information to clinicians both through auditory feedback mechanisms and a digital display on the base.



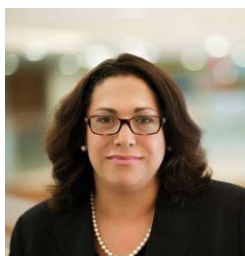
Figure 1: Functional titanium clip metal detector prototype. Wand will be used for handheld assistance in locating breast cancer.

App Type	Country	Serial No.	Patent No.	CURF Ref. Number	Inventors
Provisional	United States	NA	NA	2016-053	Delphine Dean, Cody Jordan, Melissa McCullough, Nancy DeMore, Scott Slaney, Joseph Wilson

## About the Inventors



Dr. Dean is the Gregg-Graniteville Associate Professor in the Department of Engineering at Clemson University. She earned her Ph.D. in Electrical Engineering and Computer Science from MIT. Prior to joining Clemson, Dr. Dean was a Postdoctoral Associate at MIT. She's received numerous awards, including the Award of Distinction from Clemson National Scholars Program in 2013. She also has several utility patent applications pending. Her research interests focus on nano- to micro-scale characterization of biological tissues, force microscopy and mathematical modeling such as finite element analysis.



Dr. DeMore is a surgical oncologist with 20 years of experience in breast cancer translational research. She is presently Professor of Surgery, Medical Director of the MUSC Breast Center, BMW Endowed Chair in Cancer Research, and Vice Chair of Entrepreneurship, Dept. of Surgery at the Medical University of South Carolina. She received her training in General Surgery at Boston University, during which she did a three year surgical research fellowship under the mentorship of Dr. Judah Folkman at Harvard Medical School. Before her current appointments, she served as Professor of Surgery at The University of North Carolina at Chapel Hill where her clinical practice focused on breast surgical oncology and she was PI or co-investigator on 30 clinical trials.

## For More Information

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