

# Medical Infrared Thermography: Heat Recognition from Tanks to Tumors

By Simon Yu, MD

Unknown to most medical communities, in December 2001 a major milestone occurred when a workshop titled "Tanks to Tumors" was held in Arlington, Virginia. The government speakers noted that significant military advances in thermal imaging and automated target recognition, coupled with medical understanding of abnormal vascularity, offers the prospect of automated detection of breast cancer one to two years earlier than other, more costly and invasive screening methods. Early detection has been shown to be the key to high survival probability.

The Tanks to Tumors project was underway in 1994. Potential use for infrared (IR) imaging in medicine was explored under the Department of Defense, the Office of the Secretary of Defense Science Technology, and the Defense Advanced Research Projects Agency and Army Research Office. The goal of the concerted effort was to integrate advanced IR technology with "smart" imaging processing for automatic target recognition.

Breast cancer is a national concern. One out of eight women in America will develop breast cancer during their lifetime. There are 192,000 new cases a year. It is estimated there are one million women with undetected breast cancer. The cost burden is at 18 billion dollars per year. As a result, the US Congress created "The Congressionally Directed Medical Research Program for Breast Cancer." Since, 1982, the FDA has approved IR Thermography as an adjunct modality to mammography for breast cancer.

The major challenges for wide acceptance of this non-invasive technology result from: (1) standardization and quantification of the clinical data, (2) understanding the pathophysiology of thermal signatures, (3) training in both image acquisition and interpretation and (4) the National Cancer Institute's conclusion from their sponsored "Breast Cancer Detection Demonstration Project (BCDDP)" from 1973 thru 1979 that IR Thermography lacks the sensitivity and specificity to compete with X-ray mammography.

However, the BCDDP study was criticized for its biased design of the study and the fact that the study used a radiologist who had no experience in reading IR imaging. The controversy over the study prompted calls to re-investigate the validity of the IR Thermograph. Worldwide, medical applications for IR imaging have been explored for oncology, pain management, vascular disorders, arthritis, neurology, post surgery tissue viability and sports and rehabilitation medicine.

The Tanks to Tumors workshop is a model to bring different scientific communities together: medical, military, academic, industrial, and engineering. FLIR Systems, Inc is the leading company in the world to set the standard for military and medical applications of IR technology.

The Breast Journal (1998) published a study that showed that mammography's 85% sensitivity is increased to 95% with IR thermal imaging and increased to 98% with IR thermal imaging and physical examination.

The American Journal of Radiology (Jan, 2003, Parisky) published a study in which thermal imaging was performed on 769 subjects with 875 mammographic lesions and compared the results to mammography. Thermography was 97% sensitive and showed a 95 % negative Predictive Value. The dynamic computerized infrared imaging system significantly increased the accuracy of detecting breast cancer in women who had a suspicious abnormal mammogram requiring biopsy. The conclusion of the

study was that infrared imaging offers a safe non-invasive procedure that would be valuable as an adjunct to mammography in determining whether a lesion is benign or malignant.

For those who do not want a mammogram because of concern for unnecessary radiation exposure, IR Thermography provides a safe, non-invasive risk assessment. Integrating IR Thermography with a traditional mammogram and other imaging such as MRI, ultrasound or a CT scan can increase the sensitivity and provide early warning signals for deadly cancers and may assist in avoiding an unnecessary breast biopsy.

The Tanks to Tumors IR technology workshop stated that IR Thermography can recognize early detection of tumors which will save lives. Prevention of cancer is even better. My clinic, Prevention and Healing, Inc, decided that all the benefits of IR Thermography are too compelling to ignore.

Therefore, we have implemented the FLIR Systems, Inc Infrared Thermography for Breast Cancer Risk Assessment. You may call our office and ask Angela Wells, RN, Certified Thermographer, any questions related to IR Thermal Imaging.

This article includes information from Medical Infrared Imaging by CRC press, 2008 by N. Diakides and J. Bronzino and a lecture by Alexander Mostovoy, HMD from Canada on "Breast Thermograph for Early Cancer Detection" at the American College for Advanced Medicine in Oct 2008.

Dr. Simon Yu, M.D. is a Board Certified Internist. He practices Internal Medicine with an emphasis on Alternative Medicine to use the best each has to offer. For more articles and information about alternative medicine as well as patient success stories visit his web site at [www.preventionandhealing.com](http://www.preventionandhealing.com) or call Prevention and Healing, Inc., 314-432-7802. You can also attend a free monthly presentation and discussion by Dr. Yu on Alternative Medicine at his office on the second Tuesday each month at 6:30 pm. Please call to verify the date and reserve your space.



**Simon Yu, M.D.**  
**Prevention and Healing, Inc.**  
**St. Louis, MO 63146**  
**314-432-7802**  
**[www.preventionandhealing.com](http://www.preventionandhealing.com)**

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