

**Department of Biomedical Engineering
COLLEGES OF ENGINEERING AND MEDICINE**

SUMMER RESEARCH OPPORTUNITIES FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 2, 2009

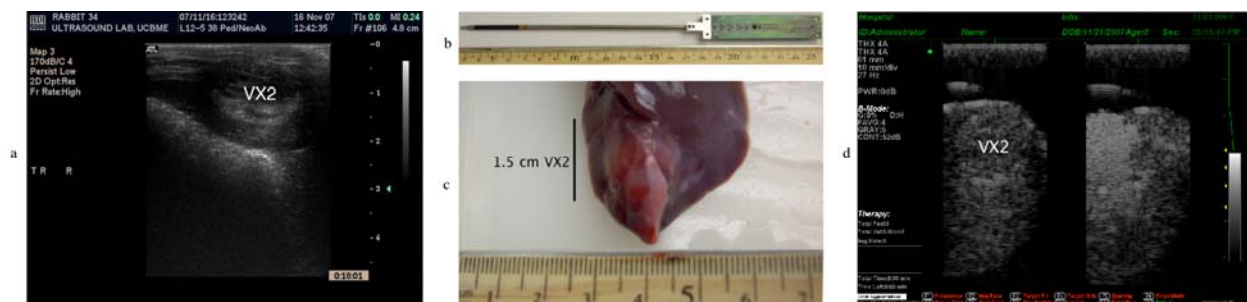
The Department of Biomedical Engineering is pleased to offer the following research project for the summer of 2009. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and if possible, develop a timetable for the twelve-week research period.

Ultrasound Image-Guided Thermal Ablation

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The Biomedical Acoustics Laboratory at the Department of Bioengineering, University of Cincinnati, is devoted to research on use of sound for medical imaging, therapy, and monitoring of therapeutic procedures. A major focus is development of ultrasound-based devices and techniques for treatment of cancer, which will improve upon existing methods such as radiofrequency ablation. We currently are collaborating with a medical device company on development and testing of novel miniaturized ultrasound array devices, which can be used to image the target region of tissue, selectively kill targeted tissue by thermal ablation, and monitor the ultrasound therapy in real time to ensure complete, specific treatment.



VX2 tumor model for ultrasound therapy. (a) Transabdominal ultrasound image of a VX2 tumor growing in rabbit liver. (b) Photograph of miniaturized 4.8 MHz image-treat array. (c) Gross appearance of VX2 tumor grown in a rabbit liver. (d) Ultrasound images of the same VX2 tumor obtained with the same 4.8 MHz image-treat array, before and after a 1 min ablation treatment.

In this summer project, the student will work with novel ultrasound imaging and therapy methods using a unique image-guided ultrasound ablation system. The student will design and perform experiments testing ultrasound ablation of target tissues including blood vessels and malignant tumors, as well as ultrasound image guidance of thermal ablation. Analytic work will include evaluation of tissue ablation histology and correlation of tissue effects with ultrasound image data.