Graduate Cancer Community @ Illinois Presents: *Dr. Michael Oelze*

Tuesday January 20
12:00 - 1:00 p.m.

Medical Sciences Building Auditorium
506 South Mathews Avenue
Urbana, IL 61801

Emerging Ultrasound Applications for Cancer:
From Diagnosing Cancer to Monitoring of Therapy to Novel Cancer Therapeutics

Ultrasound has traditionally been considered an imaging modality characterized by high spatial resolution but low contrast. Conventional ultrasonic imaging may be sensitive to the detection of anomalous tissue features, but the ability to classify these tissue features often lacks specificity. As a result, a large number of biopsies of tissues based on suspicious image findings are performed each year with a vast majority of these biopsies resulting in a negative finding. However, recent advances in ultrasound have emerged which can improve both diagnostic and therapy applications.

Quantitative ultrasound (QUS) imaging techniques have been developed that have improved the specificity of imaging by providing new sources of image contrast with specific numbers related to tissue state. QUS imaging can encompass a wide variety of techniques including spectral-based parameterization, elastography, flow estimation and envelope statistics. Spectral-based techniques include the estimation of the backscatter coefficient, estimation of attenuation, and estimation of scatterer properties such as the correlation length associated with an effective scatterer size and the concentration of scatterers. Envelope statistics include the estimation of the number density of scatterers and quantification of coherent to incoherent signals produced from the tissue. Successful applications demonstrating the ability of QUS to improve medical diagnostics include cancer detection and classification of solid tumors in the breast or thyroids, detection of micrometastases in lymph nodes and monitoring and assessment of therapy in solid tumors.

Ultrasound can also be focused on tumor volumes and the energy of focused ultrasound used to target treatment of tumors and enhance the treatment of tumors when combined with conventional therapies (i.e., radiation, chemotherapy and hyperthermia). Ultrasound-activated microbubbles can be targeted to tumor vasculature and their destruction associated with tumor cell signaling responses for apoptosis. Combining ultrasound-activated microbubbles with traditional cancer therapies results in significant and synergistic enhancements of therapy response. In our research tumors treated with ultrasound-activated microbubbles followed by hyperthermia have been demonstrated to result in an enhanced tumor kill.

Lunch will be provided for seminar attendees. If you would like to know more about our program or future events, feel free to contact us at cancer-community@illinois.edu or visit http://publish.illinois.edu/cancercommunity/.

This seminar is part of the Graduate Cancer Community @ Illinois program. Seminars are supported through funding provided by the Graduate College Focal Point initiative. For more information about cancer initiatives on the Illinois campus, please visit http://cancer.illinois.edu.