AbstractID: 6039 Title: Breast CAD in the Digital Era

Use of output from a computerized analysis of a breast image by radiologists may help them in the tasks of detection or diagnostic, and potentially improve the overall interpretation of breast images and the subsequent patient care. Many factors motivate the attempts to aid or automate radiological diagnosis. Inadequacies in interpretation performance may be due to the presence of image noise or normal anatomical structure as well as to known limitations in the human search and perception process. Developments in breast CAD have led to clinically-used detection systems in screening mammography and pre-clinical classification systems for diagnostic breast imaging. Diagnostic breast CAD systems provide output for the characterization of lesions on special-view mammography, breast sonography, and breast MRI in order to aid in patient management decisions, such as biopsy decisions. As imaging continues to expand in the digital era, computer-aided diagnosis (CAD) may become an integrated tool in the online diagnostic workup of suspect breast lesions using multi-modality images and advanced PACS. This presentation reviews research in computerized analysis of mammographic, sonographic, and magnetic resonance breast images for detection and diagnosis. It will include the characterization of lesions and the estimation of the probability of malignancy for use in the diagnostic workup of suspect lesions. CAD systems in diagnostic workup usually involve having the computer extract the margin of the lesion from the surrounding parenchyma, extract characteristics (features) of the lesions, merge these computer-extracted features into an estimate of the probability of malignancy, and as an option, retrieve automatically similar lesions from an online reference library. The aim of CAD in diagnostic workup is to increase classification sensitivity and specificity as well as to reduce intra- and inter-observer variability. While the breadth and depth of CAD is increasing, continued and expanded efforts are needed for collecting and confirming databases, establishing methods for evaluation, integrating effectively and efficiently with PACS and RIS systems, and providing means for clinical evaluation.

Learning objectives:

1. To appreciate the development of CAD in multi-modality imaging for detection and diagnosis of breast cancer.
2. To understand the benefits and challenges as CAD moves into the digital era and is integrated with PACS and HIS.
3. To recognize the necessary steps for advancing and integrating CAD clinically.

COI: Maryellen Giger is a shareholder and consultant, and receives research funding from R2 Technology, Inc.