AbstractID: 4408 Title: The Future of Image Science

The characterization and classification of image quality in radiographic imaging is a complex and illusive goal. It involves understanding the physics of x-ray interactions and how these influence statistical properties of image signals and noise. It requires an understanding of how observers can extract non-random structures from random (and sometimes not random) image details. Finally, it requires an understanding of how observers are able to extract clinically meaningful information from the complicated clutter of background structural information. As processes responsible for producing image signals are often non-linear, non-stationary, multi-dimensional and task dependent, simpler metrics of image quality and detector performance are at best idealized approximations.

Scientists have attacked this multi-faceted problem from a number of directions. As a result, a wide spectrum of terminology and concepts have become commonplace. This talk will address some aspects of how far "image science" has come and where it may be going. It will highlight accomplishments that have become established in both academic and commercial fields, and problems that have not been solved. Hopefully, improved understanding of these issues will enable the development of better detectors and systems and improved patient outcomes.

Educational Objectives:

1. Understand issues that influence image quality and observer performance for simple tasks
2. Understand limitations of simple metrics
3. Understand some directions being followed to better understand what determines image quality for the development of better detectors and systems