Kristy K. Brock, PhD
Professor
Imaging Physics

Harnessing the Power of AI for Image Guided Cancer Therapy

Kristy Brock is a Professor with tenure in the Department of Imaging Physics at the University of Texas MD Anderson Cancer Center, where she is the Executive Director for the Image-Guided Cancer Therapy Research Program. Her research has focused on image guided therapy, where she has developed a biomechanical model-based deformable image registration algorithm to integrate imaging into treatment planning, delivery, and response assessment as well as to understand an validate imaging signals through correlative pathology. Her algorithm, Morfeus, was licensed by RaySearch Laboratories and was incorporated into their commercially available radiation therapy treatment planning system. She is board certified by the American Board of Radiology in Therapeutic Medical Physics. Dr. Brock has published over 100 papers in peer-reviewed journals and is the Editor of the book ‘Image Processing in Radiation Therapy’.

Abstract: Imaging is a critical component in the detection, characterization and treatment of cancer. The rich information content of advanced imaging methods, combined with the growing capacity to collect multiple types of images from various sources and time points during therapy creates an exciting opportunity for image-based guidance and assessment of interventions for radiation oncology, surgery, and interventional radiology. However, several obstacles prevent the full exploitation of this paradigm including understanding and validating the imaging signals to enable high precision treatment intents tailored for a patient’s tumor and normal tissue profiles, resolving the natural deformations in anatomy between imaging events or between imaging and intervention events, and engaging these advanced imaging techniques to assess the patient’s response to treatment. Recent advances in artificial intelligence, specifically in deep learning, has accelerated methods to address these challenges. This presentation will illustrate recent advances in image guided cancer therapy that leverage deep learning for segmentation, registration, and outcomes prediction.

MD Anderson Cancer Center