Abstract:
Imaging guidance plays a critical role in radiation therapy. For example, cone-beam computed tomography (CBCT) has been integrated into treatment machines. In the integrated systems, imaging can be performed with a patient in the actual treatment position, allowing direct visualization of the target and relevant anatomy in the treatment room. In addition, the CBCT images also provide anatomical and density information of the patient in the treatment position, which can then be used to calculate and verify the radiation dose delivered to the patient. Although CBCT offers significant advantages for improving radiotherapy, several drawbacks limit its potentials, including: 1) the repeated use of CBCT during a course of treatment delivers high extra radiation dose to patients; 2) the presence of scatter pollution within the projection images degrades the CBCT image quality by decreasing the contrast and by introducing shading artifacts that lead to inaccuracies in reconstructed CT-number; and 3) respiration motion introduces motion artifacts in CBCT leading to decreased localization accuracy. In this talk, I will present our recent results on optimizing CBCT for image-guided adaptive radiation therapy, including both software and hardware approaches for dose reduction, scatter correction and motion compensation in CBCT. I will also discuss the use of quantitative imaging for treatment outcome prediction.

Biography:
Jing Wang received his B.S. degree in Materials Physics from University of Science and Technology of China in 2001, and the M.A. and Ph.D. degrees in physics from the State University of New York at Stony Brook in 2003 and 2006, respectively. He finished his postdoctoral training in the Department of Radiation Oncology at Stanford University in 2009. He is currently an Associate Professor and Medical Physicist in the Department of Radiation Oncology at the University of Texas Southwestern Medical Center. Dr. Wang has published more than 60 peer reviewed journal papers. His research focuses on medical imaging and its application in radiation therapy. Dr. Wang’s research has been supported by National Institute of Health, American Cancer Society, Department of Defense and Cancer Prevention and Research Institute of Texas.