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Abstract for an Invited Paper  
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### **Physics of Quantitative X-ray Imaging**

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Quantitative information obtained from medical images is an essential component in the development of personalized medicine and data-driven diagnosis and therapy. In this talk, we will present examples from x-ray radiography and computed tomography (CT) illustrating how imaging physics contributes towards improved quantitative imaging. The topics include (i) optimization of x-ray detectors to enhance spatial resolution for in-vivo morphological measurements at 100  $\mu\text{m}$  scale, (ii) application of Monte Carlo methods in imaging system design and data corrections, (iii) reconstruction algorithms incorporating physics-based modeling to enable quantitative assessment of tissue composition, in particular in spectral CT.