

MAR16-2015-003269

Abstract for an Invited Paper
for the MAR16 Meeting of
the American Physical Society

Future Directions in Medical Physics

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Medical Physics is a highly interdisciplinary field at the intersection between physics and medicine and biology. Medical Physics is aiming at development of novel applications of physical processes and techniques in various areas of medicine and biology. Medical Physics had and continues to have profound impact by developing improved imaging and treatment technologies, and helping to advance our understanding of the complexity of the disease. The general trend in medicine towards personalized therapy, and emphasis on accelerated translational research is having a profound impact on medical physics as well. In the traditional stronghold for medical physicists – radiation therapy – the new reality is shaping in the form of biologically conformal and combination therapies, as well as advanced particle therapy approaches, such as proton and ion therapies. Rapid increase in faster and more informative multi-modality medical imaging is bringing a wealth of information that is being complemented with data obtained from genomic profiling and other biomarkers. Novel data analysis and data mining approaches are proving grounds for employment of various artificial intelligence methods that will help further improving clinical decision making for optimization of various therapies as well as better understanding of the disease properties and disease evolution, ultimately leading to improved clinical outcomes.