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Introduction

Welcome to the 2009 Proceedings for the SPIE conference, Energy-based Treatment of Tissue and Assessment V. This is the eighth year that we have organized this conference and it has evolved in very strong, diverse, and clinically relevant directions. As in previous years, we have assembled a reference-quality proceedings built on papers of contemporary importance. I wish to extend my deep gratitude to all the presenters and authors of the publications, and especially to the conference committee. The strength of the papers makes the proceedings a valuable archive for years to come.

This volume includes a plethora of thermal energy sources covering microwaves, ultrasound, laser, focused ultrasound, and RF treatments. There is invaluable histopathology on both heat and cold processes, in the realm of tissue damage as well as tissue repair, all captured in the proceedings.

Thermal therapy based treatments offer great benefits to the patient, both in the realm of minimally invasive treatment that will still allow for more invasive treatment later on, or in the case of ablation, being able to offer alternatives to patients who are not surgical candidates and have few treatment options remaining. This year may be one of the best years in terms of the relevance of papers and contributions to some very important fields in medicine and disease treatment. Thermal therapy may only have success under conditions of good performance, practical image guidance, and image monitoring, all which are well represented in the proceedings.

The conference and proceedings start off with robust talks on the "Angel of Death" followed by the "Angel of Life", where tissue damage and repair processes, respectively, were showcased with great efforts toward contemporaneous explanations. Arrhenius models of thermal damage and thermal dose were then tied in. New technologies covering thermal techniques for vision correction and conformable applicators for surface cancer treatment were demonstrated. Novel ablation applicators with high power microwave surface and interstitial applicators well as ultrasound based catheter treatment systems were shown, along with tissue perfusion dynamics and measurement probes. Treatment planning with thermal and cryo subsystems along with optimization schemes were covered. Image guidance and non-invasive thermal mapping were shown, including steerable ultrasound systems under MR guidance and thermography. Microwave thermography and assessment were also shown. The whole gamut of nanoparticle investigations were shown, including performance, toxicity, targeted therapy, and combination treatments.

The assembly of the papers for this conference with its diversity of anatomical sites and energy sources share one common theme: thermal processes that will initially

damage and then repair, in both benign and malignant tissues, over a range of disease states. We are all grateful for the opportunity to bring progress to this field.

Thomas P. Ryan