

Abstract Submitted
for the APR17 Meeting of
The American Physical Society

**Brachytherapy optimization using radiobiological-based planning
for high dose rate and permanent implants for prostate cancer treatment**

KAELYN SEELEY, Univ of Pittsburgh, J. ADAM CUNHA, Univ of California, San Francisco, TAE MIN HONG, Univ of Pittsburgh — We discuss an improvement in brachytherapy prostate cancer treatment method that directly places radioactive seeds inside target cancerous regions by optimizing the current standard for delivering dose. Currently, the seeds spatiotemporal placement is determined by optimizing the dose based on a set of physical, user-defined constraints. One particular approach is the inverse planning algorithms that allow for tightly fit isodose lines around the target volumes in order to reduce dose to the patients organs at risk. However, these dose distributions are typically computed assuming the same biological response to radiation for different types of tissues. In our work, we consider radiobiological parameters to account for the differences in the individual sensitivities and responses to radiation for tissues surrounding the target. Among the benefits are a more accurate toxicity rate and more coverage to target regions for planning high-dose-rate treatments as well as permanent implants.

Kaelyn Seeley
Univ of Pittsburgh

Date submitted: 25 Sep 2016

Electronic form version 1.4