# AbstractID: 13845 Title: Single-segment IMRT Treatment Planning for Stereotactic Body Radiotherapy

**Purpose: To demonstrate the advantages of a new planning technique, "single-segment IMRT" (SS-IMRT): field optimization via inverse planning for static fields. Field optimization extends beyond beam weighting to field shaping via MLC leaves. This can present a non-uniform beam fluence to the PTV for single fields while the total plan still provides excellent dose coverage. Unlike typical IMRT, the fields are entirely static, presenting no problem for moving targets nor significantly more monitor units. This can be particularly beneficial in the case of SBRT for lung.**

**Method and Materials: Multiple treatment plans were generated for 10 patients with lung tumors adjacent to the chest wall. All patients were planned for SBRT, typically 54Gy in 3 fractions. Conventional plans had MLCs conforming to the PTV, with minor manual adjustments made to achieve conformity and protect normal structures. SS-IMRT plans used the treatment planning system's IMRT optimization to achieve those same goals while limiting each beam to a single segment. Plans were compared in terms of dose conformity and uniformity in the PTV, sparing of the normal structures, and planning time.**

**Results: In all 10 cases SS-IMRT achieved superior treatment plans with little increase in planning time. Improvements in dose conformity and uniformity depended primarily on the quality of the conventional forward plan. Significant reductions in the maximum chest-wall dose were always achieved, although sometimes the volume of chest wall receiving low to intermediate dose was increased. Overall, SS-IMRT plans were more consistent in their quality, and planning time was not significantly longer.**

**Conclusion: Inverse planning algorithms developed for IMRT can be very useful for optimizing static field shapes when dynamic treatments are not ideal (e.g. lung SBRT). The inverse planning optimization algorithm was consistently able to improve PTV coverage, reduce hotspots overall, and shift high-dose regions away from the chest wall.**